

A study on greenhouse gas

K.A.Khan¹, Md.Abdur Rahim², Mohammad Habibur Rahman³, Md. Akramuzzaman⁴

1-Department of Physics, Jagannath University, Dhaka-1100, Bangladesh

2-Bangladesh Atomic Energy Commission.

3-Bangladesh Atomic Energy Commission.

4-Bangladesh Atomic Energy Regulatory Authority.

Abstract

Carbon dioxide (CO_2) is the primary greenhouse gas emitted through human activities. In 2019, CO_2 accounted for about 80 percent of all U.S. greenhouse gas emissions from human activities. With CO_2 and other greenhouse gases, it's different. As CO_2 soaks up this infrared energy, it vibrates and re-emits the infrared energy back in all directions. About half of that energy goes out into space, and about half of it returns to Earth as heat, contributing to the 'greenhouse effect'. Greenhouse gases are those gases in the atmosphere that have an influence on the earth's energy balance. The best known greenhouse gases, carbon dioxide (CO_2), methane and nitrous oxide, can be found naturally in low concentrations in the atmosphere. Greenhouse gases are gases in Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. The main greenhouse gases are: Water vapor. Greenhouse gasses include water vapor, methane, ozone, nitrous oxide, and carbon dioxide. There may not be much of some of these gasses in our atmosphere, but they can have a big impact. Each greenhouse gas molecule is made of three or more atoms that are bonded loosely together.

Keywords: Carbon dioxide, primary greenhouse gas, water vapor, methane, ozone, nitrous oxide

I. Introduction

A greenhouse gas is called green because it absorbs infrared radiation from the Sun in the form of heat, which is circulated in the atmosphere and eventually lost to space. This ability to absorb and re-emit infrared energy is what makes CO_2 an effective heat-trapping greenhouse gas. Not all gas molecules are able to absorb IR radiation. CO_2 molecules can vibrate in ways that simpler nitrogen and oxygen molecules cannot, which allows CO_2 molecules to capture the IR photons. Neither nitric oxide nor nitrogen dioxide are greenhouse gases, although they are important in the process of creation of tropospheric ozone which is a greenhouse gas. There are several sources of nitrous oxide, both natural and anthropogenic (human), to the atmosphere with many of these sources difficult to measure. A greenhouse is a building with glass walls and a glass roof. Greenhouses are used to grow plants, such as tomatoes and tropical flowers. A greenhouse stays warm inside, even during the winter. Gases in the atmosphere, such as carbon dioxide, trap heat similar to the glass roof of a greenhouse. Gases like Carbon dioxide, methane, nitrous oxide, water vapour, etc. trap heat radiation and are called greenhouse gases.

II. Methods and materials

II.A What are the types of greenhouse gases?

Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Industrial gases: Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF_6), Nitrogen trifluoride (NF_3).

II.B What is green house effect class 9?



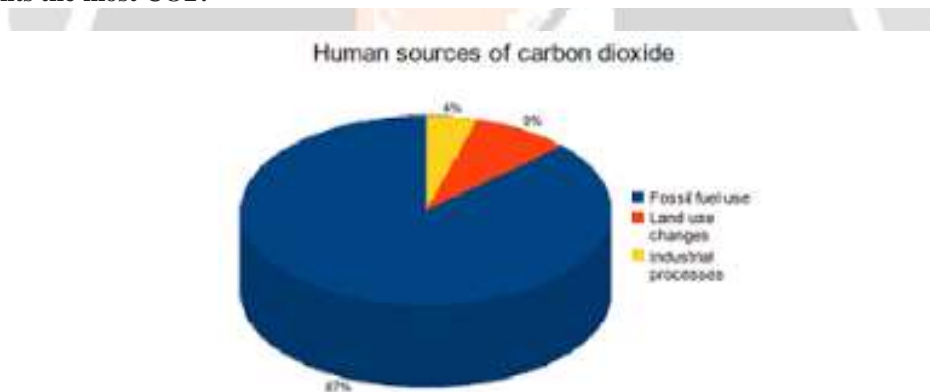
Fig.1 green house effect class 9

The greenhouse effect is the trapping of the sun's heat in the atmosphere of a planet by gases in that atmosphere. The green house effect happens because of so-called greenhouse gases, which includes carbon dioxide, methane, water vapor & other.

II.C What are greenhouse gases quizlet?

What are green house gases? Any gases compound in the atmosphere that is capable of absorbing infrared radiation thereby trapping and holding heat in the atmosphere. Examples of these gases are : water vapor, carbon dioxide, methane, nitrous oxide and ozone.

II.D What emits the most CO₂?

Fig.2 emits the most CO₂

Fossil fuel combustion/use. Coal is the most carbon intensive fossil fuel. For every tonne of coal burned, approximately 2.5 tonnes of CO₂e are produced. 6 Of all the different types of fossil fuels, coal produces the most carbon dioxide.

II.E What are greenhouse gases and its effects?

Greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals, trap some of the Earth's outgoing energy, thus retaining heat in the atmosphere.

II.F What is the most common green house gas?

Water vapor is the most abundant greenhouse gas in the atmosphere. Human activities have only a small direct influence on atmospheric concentrations of water vapor, primarily through irrigation and deforestation, so it is not included in this indicator.

II.G What are the worst greenhouse gases?

Although the most potent greenhouse gas is Methane, the worst one is still considered to be Carbon dioxide CO₂, as it is the primary gas that enters the atmosphere.

II.H Are greenhouse gases good?

Greenhouse gases are gases that can trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. Overall, greenhouse gases are a good thing. Without them, our planet would be too cold, and life as we know it would not exist.

II.I Why is it called greenhouse gas?

Greenhouse gases (GHG) include carbon dioxide, water vapor, methane, ozone, nitrous oxide and fluorinated gases. These molecules in our atmosphere are called greenhouse gases because they absorb heat.

II.J Where do greenhouse gasses come from?

In the United States, most of the emissions of human-caused (anthropogenic) greenhouse gases (GHG) come primarily from burning fossil fuels—coal, natural gas, and petroleum—for energy use.

II.K How is green gas produced?

Green gas is made through a process called anaerobic digestion. This uses bacteria to break down organic materials - like food or farm waste - to release biogas. The biogas is purified and turned into biomethane, which is injected into the gas grid. Once in the grid, it's piped into homes up and down the UK.

II.L Which is better CO₂ or green gas?

CO₂ is going to kick harder, shoot faster, and work better in colder temperatures. Due to its higher pressure, a CO₂ powered pistol will kick much harder than a green gas weapon. Also due to the pressure, most CO₂ pistols will have a higher FPS than their Green Gas counterparts.

II.M Is green gas flammable?

Green gas has always been flammable. You should never ignite propane/green gas, or release it near an open flame.

II.N What are greenhouse gases do they exist naturally?

Greenhouse gases that occur both naturally and from human activities include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and ozone (O₃).

II.O Is o₃ a greenhouse gas?

Ozone is technically a greenhouse gas, but ozone is helpful or harmful depending on where it is found in the earth's atmosphere. However, at lower elevations of the atmosphere (the troposphere), ozone is harmful to human health.

II.P Is Neon a greenhouse gas?

Neon is not a greenhouse gas. Greenhouse gases are able to absorb infrared radiation and release heat back into the atmosphere.

II.Q Is argon a greenhouse gas?



Fig.3 Greenhouse effect

Greenhouse gases include water vapor, carbon dioxide, ozone, and methane; the major components of atmospheric gas-nitrogen, oxygen, and argon-are transparent to infrared radiation.

II.R Is Sulphur a greenhouse gas?

Sulfur dioxide is regarded as an indirect greenhouse gas because, when coupled with elemental carbon, it forms aerosols. Surprisingly, aerosols contribute to both the cooling and warming of the planet.

II.S Is H₂ a greenhouse gas?

Fig.4 H₂ gas

Hydrogen (H₂) is similar to carbon monoxide in that it acts as an indirect greenhouse gas through its effect on hydroxyl (OH) radicals. By reducing the levels of OH in the atmosphere, hydrogen increases the lifetime of some direct greenhouse gases, such as methane.

II.T Is ammonia a greenhouse gas?

Air pollutants like ammonia (NH₃) are the other type of gaseous emissions from agriculture. They are not greenhouse gases, but they do negatively impact on human and animal health while also damaging ecosystems.

II.U Is greenhouse gas harmful?

Greenhouse gases have far-ranging environmental and health effects. They cause climate change by trapping heat, and they also contribute to respiratory disease from smog and air pollution. Extreme weather, food supply disruptions, and increased wildfires are other effects of climate change caused by greenhouse gases.

II.V Which are greenhouse gases?



Fig.5 Effect of greenhouse gases

The main greenhouse gases whose concentrations are rising are carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and ozone in the lower atmosphere.

II.V How does the greenhouse gases work?

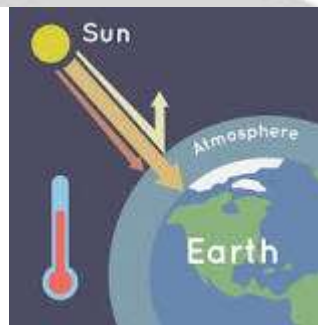


Fig.6 Working Principle of green gas

The greenhouse effect works much the same way on Earth. Gases in the atmosphere, such as carbon dioxide, trap heat similar to the glass roof of a greenhouse. These heat-trapping gases are called greenhouse gases. At night, Earth's surface cools, releasing heat back into the air.

II.W Why are greenhouses bad for the environment?



Fig.7 greenhouses bad for the environment

High Temperatures

Some greenhouses are fueled with artificial heat when the rays of the sun are not sufficient. The energy that is used to heat these greenhouses does contribute to pollution in the atmosphere. As a result, the negative effect of greenhouse gases will rise, in the form of CO₂ emissions.

II.X The Disadvantages of a Greenhouse:

- # Can be expensive to build.
- # Can be expensive to heat.
- # Requires constant monitoring, maintenance and care.
- # Could increase electrical and water bills.
- # May detract from aesthetic appeal of a garden

II.Y Why does greenhouse stay warm at night?



Fig.8 greenhouse stay warm at night

During the day, a typical greenhouse will trap heat from the sun, which allows the plants inside to stay warm at night. The much-needed sunlight will still come through, but the extra layer of protection will keep your plants safe at night.

II.Z Can you grow tomatoes all year-round in a greenhouse?



Fig.9 tomatoes all year-round in a greenhouse

Luckily, with a greenhouse you are not limited to the summer months; you can grow delicious tomatoes whenever you want. Tomatoes can be picky plants, but with a little bit of practice anyone should be able to produce their own supply of these mouth-watering delights year-round.

III. Results and discussion

Greenhouse gases (GHG) include carbon dioxide, water vapor, methane, ozone, nitrous oxide and fluorinated gases. These molecules in our atmosphere are called greenhouse gases because they absorb heat. Greenhouse gases are gases that can trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. Overall, greenhouse gases are a good thing. Without them, our planet would be too cold, and life as we know it would not exist. Climate forcing refers to a change in the Earth's energy balance, leading to either a warming or cooling effect over time. An increase in the atmospheric concentrations of greenhouse gases produces a positive climate forcing, or warming effect. Greenhouse vegetable plants may end up growing faster and stronger than those grown in a traditional garden, because you will be giving them the ideal environment for growth. You can grow greenhouse vegetable plants directly in the soil inside the enclosure, but container gardening is a more efficient use of space. So with this in mind, it's safe to say that any temperatures below 55 degrees Fahrenheit for a hothouse and below 45 degrees Fahrenheit for a cold house can be termed as "too cold for a greenhouse. For example, cacti need watered only when they have become nearly completely dry. Other plants, such

as most herbs and orchids, will also prefer a few days between waterings, provided that the greenhouse is not excessively hot. As a general rule, do not water your plants until the first couple inches of soil are dry. In the atmospheric greenhouse effect, the earth warms up because the solar energy is re-radiated back towards the earth by the greenhouse gasses. Think of a ball bouncing back and forth. But in a greenhouse, the interior air is warmed simply as a result of the heat energy from the sunlight heating up the air.

IV. Conclusions

An increase in the atmospheric concentrations of greenhouse gases produces a positive climate forcing, or warming effect. From 1990 to 2019, the total warming effect from greenhouse gases added by humans to the Earth's atmosphere increased by 45 percent. The main driver of climate change is the greenhouse effect. Some gases in the Earth's atmosphere act a bit like the glass in a greenhouse, trapping the sun's heat and stopping it from leaking back into space and causing global warming. Global warming is the change in the climate of the earth causing it to heat up whereas the greenhouse effect is a naturally occurring phenomena, constantly occurring due to the atmosphere and sunlight.

References

1. **Khan KA** (1999) Copper oxide coatings for use in a linear solar Fresnel reflecting concentrating collector, Published in the journal. of Elsevier, Renewable Energy, An International Journal, WREN(World Renewable Energy Network), UK, RE: 12.97/859,1998, Publication date 1999/8/1, J. Renewable energy, 17(4) :603-608. Publisher - Pergamon, 1999
2. T.A. Ruhane, M.Tauhidul Islam, Md. Saifur Rahman, M.M.H.Bhuiyah, Jahid M.M. Islam, T.I. Bhuiyah, **K.A.Khan** , Mubarak A. Khan(2017) Impact of photo electrode thickness annealing temperature on natural dye sensitized solar cell, Sustainable Energy Technologies and Assessments, Elsevier, <http://dx.doi.org/10.1016/j.seta.2017.01.012>
3. T.A. Ruhane, M. Tauhidul Islam, Md. Saifur Rahaman, M.M.H. Bhuiyan, Jahid M.M. Islam, M.K. Newaz, **K.A. Khan, Mubarak A. Khan**(2017) Photo current enhancement of natural dye sensitized solar cell by optimizing dye extraction and its loading period, Optik - International Journal for Light and Electron Optics, Elsevier
4. Mehedi Hasan & **K. A. Khan** (2018) Dynamic model of Bryophyllum pinnatum leaf fueled BPL cell: a possible alternate source of electricity at the off-grid region in Bangladesh, Microsystem Technologies Micro - and Nanosystems Information Storage and Processing Systems, Springer, ISSN 0946-7076, Microsyst Technol DOI 10.1007/s00542-018-4149-y
5. **K. A. Khan**, M. Hazrat Ali, A. K. M. Obaydullah & M. A. Wadud(2019) Production of candle using solar thermal technology, Microsystem Technologies Micro- and Nanosystems Information Storage and Processing Systems, Springer, ISSN 0946-7076, Microsyst Technol, 25(12), DOI 10.1007/s00542-019-04390-7
6. **K. A. Khan**, S. R. Rasel & M. Ohiduzzaman(2019) Homemade PKL electricity generation for use in DC fan at remote areas, Microsystem Technologies Micro- and Nanosystems Information Storage and Processing Systems, ISSN 0946-7076, Microsyst Technology, 25(12), DOI 10.1007/s00542-019-04422-2
7. Mehedi Hasan & **Kamrul Alam Khan** (2019) Experimental characterization and identification of cell parameters in a BPL electrochemical device, Springer, SN Applied Sciences (2019) 1:1008 | <https://doi.org/10.1007/s42452-019-1045-8>
8. Lovelu Hassan and **K. A. Khan** (2019) A study on harvesting of PKL electricity, Springer Journal, Microsyst Technol (2020) 26:1031-1041 DOI 10.1007/s00542-019-04625-7, 26(3),PP:1032-1041.
9. **K. A. Khan**, M. A. Mamun, M. Ibrahim, M. Hasan, M. Ohiduzzaman, A. K. M. Obaydullah, M. A. Wadud, M. Shajahan(2019) PKL electrochemical cell: physics and chemistry, Springer Journal, SN Applied Sciences (2019) 1:1335 | <https://doi.org/10.1007/s42452-019-1363-x>
10. M.Hazrat Ali, Unesco Chakma, Debashis Howlader, M. Tawhidul Islam and **K.A.Khan** (2019) Studies on Performance Parameters of a Practical Transformer for Various Utilizations, Microsystem Technologies, Springer, Accepted:03 Dec 2019, DOI: 10.1007/s00542-019-04711-w
11. **Khan, K.A.**, Hassan, L., Obaydullah, A.K.M. et al. Bioelectricity: a new approach to provide the electrical power from vegetative and fruits at off-grid region. Microsyst Technol (2018). <https://doi.org/10.1007/s00542-018-3808-3>
12. **Khan KA**, Bhuyan MS., Mamun M A., Ibrahim M., Hasan L., Wadud M.A.(2018), Organic Electricity from Zn/Cu-PKL Electrochemical Cell, In: Contemporary Advances in Innovative and Applicable Information Technology, Advances in Intelligent Systems and Computing, J. K. Mandal et al. (eds.), © Springer Nature Singapore Pvt. Ltd., 2018, Vol. 812, Chapter 9, p 75-90.
13. AKMAtiqueUllah,MdMahbulHaque,MahmudaAkter4,AHossain,ANTamanna,Md.MottalebHosen,AKMFazleKibria,MNI Khanand**MKAKhan**(2020)GreensynthesisofBryophyllumpinnatumaqueousleafextractmediatedbiomoleculcappeddiluteferr omagneticα-MnO2 nanoparticles, Mater.Res.Express7(1)(2020),015088, IOP publishing Ltd.
14. **K.A.Khan**, M Hazrat Ali, M. A. Mamun, M. Mahbul Haque, A.K.M. Atique Ullah, M.N. Islam Khan, Lovelu Hassan, A.K.M. Obaydullah, M.A.Wadud (2020), Bioelectrical Characterization and Production of Nanoparticles (NPs) Using PKL

- Extract for Electricity Generation, Received: 31 July 2018/Accepted: 4 February 2020, Microsystems Technology, Springer Journal, DOI 10.1007/s00542-020-04774-0.
15. **K.A. Khan** (2002) Prospect of Solar Energy for Food Supply in Bangladesh. Bangladesh J. of Scientific and Industrial Research BJSIR, 37(1-4)
 16. Sen BK., **Khan KA**, Khan MAH, Awal MA(2001) Studies on Optical & thermal properties of black copper solar selective coating on copper substance. Jahang. Phys. Stud. Department of Physics, Jahangirnagar University, Savar, Dhaka, Bangladesh, Vol. 9
 17. Ahsan MN, Sen BK, **Khan KA** & Khan MAH(1999) Performance of a Low Cost Built-in-storage Solar Water Heater. Nuclear Science and Applications, 8(1-2):
 18. Khan AJ, **Khan KA**, Mahmood ZH & Hossain M(1991) Performance of an Intermittently Tracked Linear Solar Fresnel Reflecting Concentrator. The Dhaka University studies, part B (science) vol. 39(2):
 19. **Khan KA**, Khan AJ & Rabbani KS (1998) Design & performance studies of a Linear Fresnel Reflecting Solar Concentrator-Receiver System, Bangladesh J.Sci. Res. 16 (2):143-146
 20. Islam S, **Khan KA**, Islam AKS & Ali MJ(2000) Design, Fabrication & performance study of a Paraboloidal Solar Medical Sterilizer. Bangladesh J.Sci. Res. 18(2): 211-216
 21. **K.A. Khan** (1998) Solar Selective Coating for use in Solar Concentrating Collector Bangladesh J. Sci. Res. 16(2) pp: 249-252
 22. **K.A. Khan** (1999) The performance of a Fresnel Reflecting Concentrating Collector with Auxiliary Heating Bangladesh J. Sci. Ind. Res. 34(2)
 23. **K.A. Khan** (1998) Production of Candles by Solar System in Bangladesh. Nuclear Science & Applications: 7(1-2):
 24. **K.A. Khan** (1997) Field Testing of a Fresnel Reflecting Solar Concentrator, Nuclear Science & Applications. AEC, Dhaka, Bangladesh, 6(1-2):
 25. **K.A. Khan**, Khan AJ & Rabbani KS(1998) Solar Thermal Steam Production & Distillation Device by Fresnel Reflecting Concentrator – Receiver System, Bangladesh J. Sci. Res. 16(2): 221-228.
 26. **K.A. Khan** (2008) Studies on Electricity Generation from Stone Chips Plant (Bryophyllum pinnatum), Int: J.Eng. Tech 5(4): 393-397
 27. Islam MS and **K.A. Khan** (2008) Performance Studies on Single Crystal Solar PV Modules for Practical Utilisation in Bangladesh. Int: J.Eng. Tech 5(3): 348-3528
 28. **K.A. Khan** (2008) Studies on Fill Factor(FF) of Single Crystal Solar PV Modules For Use In Bangladesh. Int: J.Eng. Tech 5(3): 328-334
 29. **K.A. Khan** (2008) Performance Studies of Monocrystalline PV module considering the shadow effect. Int: J.Eng. Tech 5(3): 342-347
 30. MS I and **K.A. Khan** (2008) Study the Deterioration of a Monocrystal Solar silicon PV module Under Bangladesh Climate. Int: J.Eng. Tech 5(2):26 3-268
 31. Hassan SJ and **K.A. Khan** (2008) Design, Fabrication and Performance Study of a Single phase Inverter for use in Solar PV system. Int: J.Eng. Tech 5(1):212-216
 32. **K.A. Khan** (2009) Soap Production Using Solar Power. Int: J. Eng. Tech 6(1):414-419
 33. **K.A. Khan** (2009) Wave and Tidal Power Generation: An Overview. Int: J. Eng. Tech 6(1):420-423, March 2009
 34. **K.A. Khan** (2009) .Materials Used in Electricity Generation by Solar Thermal System
 35. International J. Eng. Tech 6(1):515-520, June 2009
 36. **K.A. Khan** (2009) Comparative Study on Single Crystal and Polycrystalline solar pv modules for use in Bangladesh climate. Int: J. Eng. Tech 6(1):527-529
 37. **K.A. Khan** (2009) Electricity Generation From Pathor Kuchi Leaf(Bryophyllum Pinnatum). Int.J.Sustain.Agril.Tech.5(7):80-84.
 38. **K.A. Khan** (2009) Community Pathor Kuchi Leaf (PKL) Electricity Generation System. Int: J.Sustain.Agril.Tech.5(6):71-73
 39. **K.A. Khan** (2009) Solar Thermal Studies Of Open Sun Drying (OSD) of Various Crops Under Bangladesh Climatic Condition. Int: J. Sustain. Agril. Tech. 5(7): 85-94.
 40. **K.A. Khan** (2009) An Investigation on Various Solar Cells Under the Climatic Condition of Bangladesh. Int: J. Eng. Tech. 6(3): 547-551, September 2009
 41. **K.A. Khan** and Alam MM (2010) Performance of PKL (Pathor Kuchi Leaf) Electricity and its Uses in Bangladesh. Int. J. SOC. Dev. Inf. Syst. 1(1): 15-20
 42. **K.A. Khan** and Alam MM (2010) Comparative Study of Solar Home System and Pathor Kuchi Leaf Home System with Light Emitting Diode. Int. J. Sustain. Agril. Tech. 5(6): 74-79
 43. **K.A. Khan** and Arafat ME (2010) Development of Portable PKL (Pathor Kuchi Leaf) Lantern. Int. J. SOC. Dev. Inf. Syst. 1(1):
 44. **K.A. Khan** and Bosu R (2010) Performance study on PKL Electricity for Using DC Fan. Int. J. SOC. Dev. Inf. Syst. 1(1): 27-30
 45. **K.A. Khan** and Hossain MI(2010) PKL Electricity for Switching on the Television and Radio. Int. J. SOC. Dev. Inf. Syst. 1(1): 31-36
 46. **K.A. Khan** and Islam MS(2010) Studies on Performance of Solar Photovoltaic System Under the Climate Condition of Bangladesh. Int: J. SOC. Dev. Inf. Syst. 1(1): 37-43

47. **Khan KA** , Wadud MA, Obaydullah AKM and Mamun MA(2018) PKL (Bryophyllum Pinnatum) electricity for practical utilization. IJARIE-ISSN(O)-2395-4396, 4(1): 957-966
48. **K.A. Khan** (2009) Application of Solar Thermal Technology for Various Developing Countries. Int: J. Eng. Tech. 6(6):
49. Saifuddin SM & **K.A. Khan** (2010) Performance Study of Hybrid SPV, ST and BPL/PKL electricity Generation and storage for Practical Utilization in Bangladesh. Int: J. Eng. Tech : ISSN 1812 – 7711, 7(2)
50. Saifuddin SM & **K.A. Khan** (2010) Survey of Hybrid Solar Photovoltaic (SPV) and Solar Thermal (ST) Collectors in Bangladesh. Int: J. Eng. Tech : ISSN 1812 – 7711, 7(3)
51. Saifuddin SM & **K.A. Khan** (2010) Performance Study of Solar Photovoltaic and Solar Thermal Hybrid System Utilized in India. Int: J. Soc. Dev. Inf. Syst. 1 (4) : 10 – 16
52. **K.A. Khan** (2010) Organic Electricity Generation, Storage and Utilization by PKL (Bryophyllum Pinnatum). Int: Journal of Social Development and Information system(IJSDIS).1(6):
53. Sultana J, **Khan KA** and Ahmed MU(2010) Present situation of Solar Photovoltaic System in different countries. ASA University Review, 4(2) ISSN:1997-6925
54. Rahman AA and **K.A. Khan** (2011) The Present situation of the Wave energy in some different countries of the world. IJCIT, ISSN 2078 5828(print),ISSN 2218-5224(online),2(1) Manuscript code:110754
55. Hasnat A,Ahmed P,Rahman M and **Khan KA**(2011) Numerical Analysis for Thermal Design of a Paraboloidal Solar Concentrating Collector. Int: Journal of Natural Sciences(2011),1(3): 68-74
56. **K.A. Khan** & Rubel AH(2011) Simulated Energy Scenarios of the Power Sector in Bangladesh. ASA University Review, 5(2): 101-110, ISSN:1997-6925
57. Sultana J, **Khan KA** and Ahmed MU(2011) Studies on Hybrid Pathor Kuchi Leaf (PKL)/Bryophyllum Pinnatum Leaf(BPL) and Solar Photovoltaic Electricity Generation. J.Asiat.Soc.Bangladesh.Sci.,37(2):181-188,
58. Sultana J, **Khan KA** and Ahmed MU(2011) Electricity Generation from Pathor Kuchi Leaf(Bryophyllum Pinnatum). J.Asiat.Soc.Bangladesh.Sci.,37(2):167-179
59. Rashid MA, Rashed-Al-Mamun RA, Sultana J, Hasnat A, Rahman M and **Khan KA** (2012) Evaluating the Solar Radiation System under the Climatic Condition of Bangladesh and Computing the Angstrom Coefficients, International Journal of Natural Sciences . 2(1):38- 42. Received: November 2011, Accepted: March 28, 2012.
60. Sultana J, **Khan KA** and Ahmed MU(2012) The Present Situation of Solar Thermal Energy in the World. ASA University Review, 4(2), ISSN:1997-6925
61. Paul S, **Khan KA**, Islam KA, Islam B and Reza MA(2012) Modeling of a Biomass Energy based (BPL) Generating Power Plant and its features in comparison with other generating Plants. IPCBEE vol. 44 (2012) @ (2012) IACSIT Press, Singapore, DOI: 10.7763/ IPCBEE. 44(3):
62. K.A. Khan, Paul S, Zishan SR, Abidullah M, Mahmud S(2012) Design of a Hybrid Model of BPL Electricity Module and Solar Photovoltaic Cell. Int: J. of Sci. Eng. Research. 3(12), ISSN 2229-5518.
63. **K.A. Khan**, Paul S, Zishan SR, Abidullah M, Mahmud S(2012) A Study on Tidal Power Conversion for Use in Bangladesh. Int: J. of Sci. Eng. Research. 3(12), ISSN 2229-5518.
64. Bhuiyan MSA, **Khan KA** and Javed MA(2012) A Computerized study on the metrological parameter conversions for rural agribusiness development. J.of Innovation & Development Strategy (JIDS) (J. Innov. Dev. Strategy) J. Innov. Dev. Strategy 6(2):94-98
65. **K.A. Khan**, Paul S, Zobayer A, Hossain SS(2013) A Study on Solar Photovoltaic Conversion. Int:J. of Sci. and Eng. Research , 4(3), ISSN2229-5518
66. **K.A. Khan**, Shuva Paul, Abdullah M, Sifat SM and Yousufe MR (2013) Performance Analysis of BPL/PKL Electricity Module. Int:J. of Sci. and Eng. Research, 4(3),ISSN2229-5518
67. **K.A. Khan**, Paul S, Zobayer A, Hossain SS(2013) A Study on Solar Thermal Conversion. Int:J. of Sci. and Eng. Research, 4(3),ISSN2229-5518
68. Bhuiyan MSA and **Khan KA**(2013) Software Development Studies on the Metrological Conversions for Local Agri-Business Units of Area and Volume Weight Measures. J. of Innovation & Development Strategy (JIDS), Canada, 7(1): ISSN 1997-2571
69. Ahsan MM, Kumar S, **K.A. Khan**, Khanam MN, Khatun R, Akter S, Aheikh MAR, Islam MM, Islam MS, Saha S and Alam MM(2013) Study of Spatial Resolution of a Positron Emission Tomography(PET) System. Jagannath University Journal of Science, 2(1),ISSN 2224 – 1698.
70. Paul S, **Khan KA** and Asaduzzaman (2013) A Analytical Study on Electro chemistry for PKL (Pathor Kuchi Leaf) Electricity Generation System. Published in the Proceedings of IEEE, ENERGYTECH 2013, USA. [Participated and Presented in the “EnergyTech2013Conference sponsored by the Institute of Electrical and Electronic Engineers(IEEE) at Case Western Reserve University in Cleveland, Ohio, USA, 21 May - 23 May, 2013, USA.]
71. Paul S, **Khan KA** and Kundu RK(2013) Design, Fabrication and Performance Analysis of Solar Inverter. Published in the Proceedings of IEEE, ENERGYTECH 2013, USA. [Participated and Presented in the “EnergyTech2013Conference sponsored by the Institute of Electrical and Electronic Engineers(IEEE) at Case Western Reserve University in Cleveland, Ohio, USA, 21 may-23 May ,2013, USA.]
72. Paul S, **Khan KA** and Ripon Kumar Kundu RK (2013) Performance Studies of Mono-Crystal Silicon Solar Photovoltaic module with booster reflector under Bangladeshi Climatic condition. Published in the Proceedings of IEEE, ENERGYTECH 2013, USA. [Participated and Presented in the “EnergyTech2013Conference sponsored by the Institute of

- Electrical and Electronic Engineers(IEEE) at Case Western Reserve University in Cleveland, Ohio, USA, 21 May-23 May ,2013, USA.]
73. Rahman AA and **K.A. Khan** (2013) Feasibility Studies on WEC (Wave Energy Converter) for use in Coastal Belt at Cox's Bazar of Bangladesh under the Climate Condition of the Bay of Bengal. Int: J. of Engi. and Innovative Technology, 3660 East Bay Drive, Apartment no.116 Largo, Florida US, 33771 (IMPACT FACTOR:1.895) (ISO 9001:2008 Certified)
 74. Hossain M , Alam S and **Khan KA** (2013) A study on low power generation from Pathor Kuchi Leaf (Bryophyllum) for practical utilization in Bangladesh. Int: J. of Engi. and Innovative Technology, 3660 East Bay Drive, Apartment no.116 Largo, Florida US, 33771 (ISO 9001:2008 Certified)
 75. Bakshi M and **Khan KA**(2014) "Electricity Generation from Bryophyllum Pinnatum Leaf (BPL)-An Innovative approach for both Physicist and Chemist". J. of Int: Organization of Sci. Research (IOSR) Review Report (Article id: F42028)
 76. **Khan KA**, Latif A, Alam A, Sultana J and Ali H(2014) A Study on Internal Resistance of the Pathor Kuchi Leaf (PKL) Cell. J. of Agriculture and Environment. 10(1):24-28.
 77. Ahasan MN, Quadir DA, **Khan KA** and Haque MS (2014) Simulation of a thunderstorm event over Bangladesh using wrf-arw model. J. of Mechanical Engineering, 44(2) Transaction of the Mechanical Engineering Division, The Institute of Engineers, Bangladesh.
 78. **Khan KA**, Sultana J, Latif MA, Mamun MA and Saime MA (2014) A new approach of increasing the power output of Pathor Kuchi Leaf (PKL) Cell. Journal of Agriculture and Environment. 10(2):15-19
 79. **K.A. Khan**, Bakshi MH, Mahmud AA (2014) Bryophyllum Pinnatum leaf (BPL) is an eternal source of renewable electrical energy for future world. J. of American Journal of Physical Chemistry 3(5):77-83, Published online November 10, 2014(<http://www.sciencepublishinggroup.com/j/ajpc>) doi:10.11648/j.ajpc.20140305.15 ISSN: 2327-2430 (Print); ISSN: 2327-2449 (Online)
 80. Uddin MK, **K.A. Khan**, Sobhan MA, Ahmed F and Nabi MN(2015) On the Implications of Dynamic Wireless Spectrum Management Canons Issues in Uncertainty Use of Cognitive Radio Published in the journal of the Bangladesh Electronics Society Journal (BESJ), 15(1-2):17-24
 81. Uddin MK, **K.A. Khan**, Ahmed F and Nabi MN(2015) A Concept of Potential Radio Spectrum Administration Seeking Easy Access Spectrum (EAS) Paradigm Figured on Signal to Interference Noise Ratio (SINR) and Interference Thresholds. J. of the Bangladesh Journal of Scientific and Industrial Research, 2015 (in Review).
 82. Uddin MK, **K.A. Khan**, Sobhan MA, Ahmed F and Nabi MN(2015) Dispensation of Commons Radio Spectrum Management Framework Issues in Implementation: Challenges and Opportunities. J. of Electronic Engineering, 2015 (in Review)
 83. Uddin MK, **K.A. Khan**, Sobhan MA, Ahmed F and Nabi MN(2015) Dispensation of Commons Radio Spectrum Management Using Conceptual Benefit and Cost Analysis Framework Issues in Bangladesh. J. of the Chittagong University Journal of Science, 2015 (in Press)
 84. Shamsuzzaman M, Sikder S, Siddiqua T, Rahman MS, Bhuiyan MMH, **Khan KA**, and Paul D(2015) Standardization of Gamma Radiation Field for Characterizing Radiation Detecting Instrument at SSDL facilities in Bangladesh. J. of the Bangladesh Journal of Physics (BJP), 18: 65-72, ISSN No.: 1816-1081, BPS.
 85. Kabir MU, Sobhan MA, **K.A. Khan**, Khan MAR(2015) Broad Network Wide Statistics of TCP Indicator Measurements to Reassume the Status of the Wireless 3G Network Monitoring. Journal of the Journal of the University of Information Technology and Sciences (UITS) Journal. 4(2), ISSN: 2226-3128
 86. **Khan KA**, Islam F, Guha B, Hassan ML and Mostofa MM (2015) Studies on Discharge Characteristics and Temperature effect of PKL (Pathor Kuchi Leaf) Cell. J. of " Bangladesh J. of Agriculture and Environment". 11(2):07-12
 87. Sruti RN, Islam MM, Rana MM, Bhuiyan MMH, **Khan KA**, Newaz MK and Ahmed MS (2015) Measurement of Percentage Depth of a Linear Accelerator for 6 MV and 10 MV Photon Energies. J. of Nuclear Science and Applications, AEC, Dhaka, Bangladesh, 24(1-2):29-32.
 88. Uddin MK, Sobhan MMA, Ahmed F, **K.A. Khan** and Nabi MN(2015) A potential Electrical and Electronic Debris Management Model and Ecological Impact and Awareness Issues in Bangladesh. Journal of the National University J. of Science. 2(1), ISSN: 1994-7763
 89. Akter T, Rubel A, Ahsan M, Mamun MA and **Khan KA** (2016) A Comparative study on PKL (Bryophyllum Pinnatum), Aloe Vera, Lemon and Tomato juice for Electricity Generation, Int: J. of Sci. and Eng. Research (IJSER) - ISSN 2229-5518) 7(11):
 90. Hasan MM, **K.A. Khan**, Rahman MN and Islam MZ (2016) Sustainable Electricity Generation at the coastal areas and the Islands of Bangladesh Using Biomass Resource. J. of City University, 2(1): pp 09-13
 91. Kabir MU, Ahmed F, Sobhan DMA and **K.A. Khan** (2016) Dispensation of Commons Radio Spectrum Management Framework Issues in Implementation: Challenges and Opportunities. J. of the Bangladesh Electronic Society (BES), (ISSN: 1816-1510), 16(1-2):
 92. **K.A. Khan**, Paul S, Rahman MS, Kundu RK, Hasan MM, Muniruzzaman M and Mamun MA(2016) A study of performance analysis of PKL electricity generation parameters:(An experimental analysis on voltage regulation, capacity and energy efficiency of pathor kuchi leaf (PKL) electricity cell). Power India International Conference (PIICON), 7th, 25-27 Nov. 2016, IEEE, Bikaner, Rajasthan, India.
 93. **Khan KA**, Alam MS, Mamun MA, Saime MA & Kamal MM(2016) Studies on electrochemistry for Pathor Kuchi Leaf Power System, J. of Bangladesh J. Agric. And Envirin. 12(1): 37-42

94. Akter T, Bhuiyan MH, **Khan KA** and Khan MH(2017) Impact of photo electrode thickness and annealing temperature on natural dye sensitized solar cell. J. of Elsevier. Ms. Ref. No.: SETA-D-16-00324R2
95. **K.A. Khan** (2017) Performance evaluation of Vegetative and fruits Zn/Cu based electrochemical cell. Abstract published and Presented in the APS April meeting, January 28-31, 2017, Session T1 (Page No.: 200), Washington DC, USA. Bulletin of the American Physical Society, 62(1):
96. **K.A. Khan** (2017) Performance of electricity generation from Bryophyllum Leaf for Practical Utilization, Abstract published and Presented in the APS April meeting, January 28-31, 2017, Session T1 (Page No.: 201), Washington DC, USA. Bulletin of the American Physical Society. 62(1):
97. Mamun MA, Khan MI, **K.A. Khan**, Shajahan M(2017) A study on the Performance and electrochemistry of Bryophyllum Pinnatum Leaf (BPL) electrochemical cell. Abstract published and Presented in the APS April meeting, January 28-31, 2017, Session T1 (Page No.: 201), Washington DC, USA. Bulletin of the American Physical Society, 62(1):
98. **Khan KA**, Alam MS, Rahman M, Mamun MA and Kamal MM(2017) Studies on energy efficiency for PKL (Pathor Kuchi Leaf) Power System. Bangladesh J. of Agriculture and Environment. Paper Code: BJAIE/15/280
99. **Khan KA**, Hasan L and Islam A(2017) Electricity Production from Vegetative and fruits. 4th Int: conference on Microelectronics, Circuits and Systems, June 3rd - 4th, 2017, Darjeeling, West Bengal, India.
100. Hasan M, **Khan KA** and Mamun MA(2017) An Estimation of the Extractable Electrical Energy from Bryophyllum pinnatum Leaf. American Int: J. of Research in Science, Technology, Engineering & Mathematics, ISSN (Print): 2328-3491, ISSN (Online): 2328-3580, ISSN (CD-ROM): 2328-3629
101. Hasan M, Hassan L, Haque S, Rahman M, **Khan KA**(2017) A study to analyze the self-discharge characteristics of Bryophyllum pinnatum leaf fueled bpl test cell. J. of IJRET, 6(8):
102. Asrafusjaman M, Akter T, Hasan M, Mamun MA and **Khan KA** (2017) A Comparative study on the Effect of Sodium Chloride as a Secondary Salt use in PKL (Scientific name- Bryophyllum pinnatum) and Lemon Juice for Electricity Generation. Thirty-Second Int: Conference on Solid Waste Technology and Management, Philadelphia, PA U.S.A
103. Ruhane TA, M. Islam MT, Rahaman MS, Bhuiyan MMH, Islam JMM, Newaz MK, **Khan KA**, Khan MA(2017) Photo current enhancement of natural dye sensitized solar cell by optimizing dye extraction and its loading period. J. of Elsevier Optik- Int: J. for Light and Electron Optics, Available online 6 September 2017
104. **Khan KA**, and Hossain MS(2017) Development of 1 KW PKL mini power plant for practical utilization at the off-grid region. National conference (2 days) on Science, Technology & Environment: Prospects and Limitations in the 21st Century (NCSTEPL-2017), Organised by Venue: (B.B Engg College, Assam) Bineswar Brahma Engineering College (A Govt of Assam Institution), Chandrapara, Kokrajhar-783370, Assam, (30 & 31 October)
105. Hasan M, Hassan L, Haque S, Rahman M, **Khan KA** (2017) A Study to Analyze the Self-Discharge Characteristics of Bryophyllum Pinnatum Leaf Fueled BPL Test Cell. Journal of IJRET, 6 (12): (with paper id 20170609104.)
106. Hasan M, Haque S, & **Khan KA** (2016) An Experimental Study on the Coulombic Efficiency of Bryophyllum pinnatum Leaf Generated BPL Cell. IJARIE-ISSN(o)-2395-4396, 2(1):
107. **K.A. Khan**; Rahman MS; Das T; Ahmed MN; Saha KN; Paul S (2017) Investigation on parameters performance of Zn/Cu electrodes of PKL, AVL, Tomato and Lemon juice based electrochemical cells: A comparative study. Published in the Electrical Information and Communication Technology (EICT), 2017 3rd International Conference on IEEE Xplore: 01 February 2018, DOI: [10.1109/EICT.2017.8275150](https://doi.org/10.1109/EICT.2017.8275150) Publisher: IEEE Conference Location: Khulna, Bangladesh.
108. **Hossain MA**, **K.A. Khan**, Quayum ME(2017) Performance development of bio-voltaic cell from arum leaf extract electrolytes using zn/cu electrodes and investigation of their electrochemical performance. Int: J. of Advances in Science Engineering and Technology, ISSN: 2321-9009, 5(4):, Spl. Issue-1 Nov.-2017.
109. Hassan SJ & **Khan KA** (2007) Determination of Optimum Tilt angles of Photovoltaic panels in Dhaka, Bangladesh. Int: J. Eng. Trach 4 (3): 139-142
110. **K.A. Khan**, Rahman MS, Das T, Saha KN and Mamun MA(2018) Investigate the Cell efficiency Of PKL Cell. Published in the Int: Conference on Electrical, Electronics, Computers, Communication, Mechanical and Computing (EECCMC) 28th & 29th January 2018 Priyadarshini Engineering College, Chettiyappanur, Vaniyambadi - 635751, Vellore District, Tamil Nadu, India. Paper Code: 01-2018-1158
111. **K.A. Khan** and A K M Obaydullah AKM (2018) Construction and Commercial Use of PKL Cell. Published in the IJARIE-ISSN(O)-2395-4396, 4(2):3563-3570
112. **K.A. Khan**, Obaydullah AKM, Wadud MA and Hossain MA (2018) Bi-Product from Bioelectricity. IJARIE-ISSN(O)-2395-4396, 4(2): 3136-3142
113. **Khan KA**, Wadud MA, Hossain MA and Obaydullah AKM (2018) Electrical Performance of PKL (Pathor Kuchi Leaf) Power. IJARIE-ISSN(O)-2395-4396, 4(2):3470-3478
114. **Khan KA**, Hossain MA, Obaydullah AKM and Wadud MA(2018) PKL Electrochemical Cell and the Peukert's Law. IJARIE-ISSN(O)-2395-4396, 4(2):4219-4227
115. **Khan KA**, Ali MH, Mamun MA, Haque MM, Ullah AKMA, Dr. Mohammed Nazrul Islam Khan DMNI, Hassan L, Obaydullah AKM, Wadud MA(2018) Bioelectrical Characteristics of Zn/Cu- PKL Cell and Production of Nanoparticles (NPs) for Practical Utilization. 5th Int: conf. on 'Microelectronics, Circuits and Systems', Micro2018, 19th and 20th May, 2018, Venue: Bhubaneswar, Odisha, India, Organizer: Applied Computer Technology, Kolkata, West Bengal, India, Page: 59-66, www.actsoft.org, ISBN: 81-85824-46-1, In Association with: International Association of Science, Technology and Management.

116. Hassan MM, Arif M and **Khan KA** (2018) Modification of Germination and growth patterns of Basella alba seed by low pressure plasma. Journal of Modern Physics, 5(3), pp:17-18
117. **Khan KA**, Manir SMM, Islam MS, Jahan S, Hassan L, and Ali MH(2018) Studies on Nonconventional Energy Sources for Electricity Generation. Int: J. Of Advance Research And Innovative Ideas In Education.4(4): 229-244
118. **Khan KA**, Hasan M, Islam MA, Alim MA, Asma U, Hassan L, and Ali MH (2018) A Study on Conventional Energy Sources for Power Production. Int: J. Of Advance Research And Innovative Ideas In Education. 4 (4) : 229-244
119. **Khan KA**, Rahman MS, Paul S(2017)Investigation on parameters performance of Zn/Cu electrodes of PKL, AVL, Tomato and Lemon juice based electrochemical cells: A comparative study. Publication Year: 2017, Page(s):1-6, Published in: 2017 3rd International Conference on Electrical Information and Communication Technology (EICT), Date of Conference: 7-9 Dec. 2017, Date Added to IEEE Xplore: 01 February 2018, ISBN Information:INSPEC Accession Number: 17542905, DOI: 10.1109/EICT.2017.8275150, Publisher: IEEE, Conference Location: Khulna, Bangladesh 2018
120. **K.A. Khan** (2018) An Experimental Observation of a PKL Electrochemical Cell from the Power Production View Point. Presented as an Invited speaker and Abstract Published in the Conference on Weather Forecasting & Advances in Physics, Department of Physics, Khulna University of Engineering and Technology (KUET), Khulna, Bangladesh. 2018
121. Guha P, Islam F and **Khan KA**(2018) Studies on Redox Equilibrium and Electrode Potentials.IJARIE-ISSN(O)-2395-4396, 4(4):1092-1102, 2018
122. Islam F, Guha P and **Khan KA**(2018) Studies on pH of the PKL Extract during Electricity Generation for day and night time collected Pathor Kuchi Leaf.IJARIE-ISSN(O)-2395-4396, 4(4):1103 -1113
123. Hassan SJ & **Khan KA** (2007) Design, Fabrication and performance study of Bucket type solar candle machine. Int: J. Eng. Trach 4 (3):
124. MAH Khan & **K.A. Khan** (2005) Selective Black - Nickel coating for use in linear Fresnel Reflecting concentrating collector. Nuclear science and Applications. 14(11) :
125. **Khan KA**, Rahman ML, Islam MSI, Latif MA, Hossain MA, Saime MA and Ali MH (2018) Renewable Energy Scenario in Bangladesh. J. of IJARII, 4(5) : 270-279, ISSN(O)-2395-4396.
126. **Khan KA** and Rasel SR (2018) Prospects of Renewable Energy with Respect to Energy Reserve in Bangladesh Published in the journal of IJARII. ISSN(O)-2395-4396. 4(5):280-289
127. **Khan KA**, Hossain MS, Kamal MM, Rahman MA and Miah I (2018) Pathor Kuchi Leaf : Importance in Power Production. IJARIE-ISSN(O)-2395-4396 , 4(5):
128. **Khan KA**, Ali MH, Mamun MA, Ibrahim M, Obaidullah AKM, M. Hossain A and Shahjahan M(2018) PKL Electricity in Mobile Technology at the off-grid region.Published in the proceedings of CCSN-2018, 27-28 October, 2018 at Kolkata, India.
129. **Khan KA** and Hossain A (2018) Off-grid 1 KW PKL Power Technology: Design, Fabrication, Installation and Operation Published in the proceedings of CCSN-2018, 27-28 October, 2018 at Kolkata, India.
130. **Khan KA**, Mamun MA, Ibrahim M, Hasan M, Ohiduzzaman M, Obaidullah AKM, Wadud MA and Shajahan M (2018) PKL electrochemical cell for off-grid Areas: Physics, Chemistry and Technology Published in the proceedings of CCSN-2018, 27-28 October, 2018 at Kolkata, India.2018
131. **Khan KA**, and Rasel SR (2018) Studies on Wave and Tidal Power Extraction Devices. Int: J. Of Advance Research And Innovative Ideas In Education. 4(6):61-70
132. **Khan KA**, Ahmed SM, Akhter M, Hossen MRAM (2018) Wave and Tidal Power Generation.Int: J. Of Advance Research And Innovative Ideas In Education. 4(6):71-82
133. **Khan KA**, Rahman MA, Islam MN, Akter M, and Islam MS(2018) Wave Climate Study for Ocean Power Extraction. Int: J. Of Advance Research And Innovative Ideas In Education.4(6):83-93
134. **Khan KA**, Miah MS, Ali MI, Sharma KS, and Quader A(2018) Studies on Wave and Tidal Power Converters for Power Production. Int: J. Of Advance Research And Innovative Ideas In Education. 4(6):94-105
135. **Khan KA**, Ali MH, Obaydullah AKM, Wadud MA(2018) Candle Production Using Solar Thermal Systems.1st Int: Conference on 'Energy Systems, Drives and Automations', ESDA2018, Page: 55-66.
136. **Khan KA**, Rasel SR and Ohiduzzaman M(2018) Homemade PKL Electricity Generation for Use in DC Fan at Remote Areas.1st Int: Conference on 'Energy Systems, Drives and Automations', ESDA2018, Page: 90-99.
137. **Khan KA** and Yesmin F (2019) PKL Electricity- A Step forward in Clean Energy. Int:J. Of Advance Research and Innovative Ideas In Education. 5 (1): 316-325
138. **Khan KA** and Yesmin F(2019) Cultivation of Electricity from Living PKL Tree's Leaf. Int: J. Of Advance Research And Innovative Ideas In Education. 5 (1):462-472
139. **Khan KA** and Yesmin F(2019) Solar Water Pump for Vegetable field under the Climatic Condition in Bangladesh. Int: J. Of Advance Research And Innovative Ideas In Education. 5 (1):631-641
140. **Khan KA**, Rasel SR and Ohiduzzaman M(2019) Homemade PKL Electricity Generation for Use in DC Fan at Remote Areas.Accepted and is going to be published in Microsystem Technologies, Springer, MITE-D-19-00131, 27 February, 2019.
141. **Khan KA**, Ali MH, Obaydullah AKM, Wadud MA (2019) Production of Candle Using Solar Thermal Technology. Accepted and is going to be published in Microsystem Technologies, Springer, MITE-D-1900119-, 04 March, 2019.
142. **Khan KA** , and Rasel SR(2019) Solar Photovoltaic Electricity for Irrigation under Bangladeshi Climate. Int: J. Of Advance Research And Innovative Ideas in ducation. 5 (2): 28-36

143. **Khan KA** and Rasel SR(2019) The Present Scenario of Nanoparticles in the world. Int: J. Of Advance Research And Innovative Ideas In Education. 5 (2):462-471
144. **Khan KA**, Yesmin F, Wadud MA and Obaydullah AKM (2019) Performance of PKL Electricity for Use in Television. Int: Conference on Recent Trends in Electronics & Computer Scienc-2019, Venue: NIT Silchar, Assam, India. Conference date: 18th and 19th of March, 2019. Organizer: Department of Electronics and Engineering, NIT Silchar, Assam, India. Page: 69
145. Mamun MA, Ibrahim M and Shahjahan M and **Khan KA** (2019) Electrochemistry of the PKL Electricity.Int: Conference on Recent Trends in Electronics & Computer Scienc-2019, Venue: NIT Silchar, Assam, India, Conference dates: 18th and 19th of March, 2019. Organizer: Department of Electronics and Engineering, NIT Silchar, Assam, India. Page: 71
146. Khan KA, Hossain MA , Kabir MA, Rahman MA and Lipe P(2019) A Study on Performance of Ideal and Non-ideal Solar Cells under the Climatic Situation of Bangladesh. Int:J. Of Advance Research And Innovative Ideas in Education.5(2): 975-984
147. **Khan KA** (1999) Copper oxide coatings for use in a linear solar Fresnel reflecting concentrating collector, Publication date 1999/8/1, J. Renewable energy, 17(4) :603-608. Publisher – Pergamon, 1999
148. Ohiduzzaman M, Khan KA, Yesmin F and Salek MA (2019) Studies on Fabrication and Performance of Solar Modules for practical utilization in Bangladeshi Climate. IJARIE, 5(2): 2626-2637
149. **K.A.Khan** and Salman Rahman Rasel (2019) A study on electronic and ionic conductor for a PKL electrochemical cell, IJARIE, 5(2): 3100-3110.
150. M Ohiduzzaman, R Khatun, S Reza, **K A Khan**, S Akter, M F Uddin, M M Ahasan (2019) Study of Exposure Rates from various Nuclear Medicine Scan at INMAS, Dhaka. IJARIE, 5(3): 208-218
151. **K.A.Khan** and Salman Rahman Rasel(2019) Development of a new theory for PKL electricity using Zn/Cu electrodes: per pair per volt, IJARIE, 5(3):1243-1253
152. **K.A. Khan** & M. Abu Salek(2019) A Study on Research, Development and Demonstration Of Renewable Energy Technologies, IJARIE, 5(4):113-125
153. K.A. Khan, Mohammad Nazim Uddin, Md. Nazrul Islam, Nuruzzaman Mondol & Md.Ferdous(2019) A Study on Some Other Likely Renewable Sources for Developing Countries, IJARIE, 5(4):126-134
154. Hasan,M.& **Khan, K.A.** (2019) Experimental characterization and identification of cell parameters in a BPLElectrochemical device.SN Appl.Sci.,1:1008.<https://doi.org/10.1007/s42452-019-1045-8>
155. **K.A. Khan** & S.M. Zian Reza(2019) The Situation of Renewable Energy Policy and Planning in Developing Countries, IJARIE, 5(4):557-565
156. **K.A. Khan** & M. Abu Salek (2019) Solar Photovoltaic (SPV) Conversion: A Brief Study, IJARIE, 5(5):187-204
157. **K.A.Khan**, Nusrat Zerlin , S.M.Noman Chy.,M.Nurul Islam, Ruchi Bhattacharjee(2019) A study on voltage harvesting from PKL living plant, IJARIE, 5(5): 407-415
158. **K.A. Khan**, M.A. Mamun, M. Ibrahim, M. Hasan, M.Ohiduzzaman, A.K.M. Obaydullah, M.A.Wadud, M. Shahjahan(2019),PKL electrochemical cell: physics and chemistry,SN Applied Sciences(2019)1:1335,<https://doi.org/10.1007/s42452-019-1363-x>
159. M. N. F.Rab, **K. A. Khan**, Salman Rahman Rasel, M Ohiduzzaman, Farhana Yesmin, Lovelu Hassan ,M. Abu Salek , S.M.Zian Reza and M.Hazrat Ali(2019) Voltage cultivation from fresh leaves of air plant, climbing spinach, mint, spinach and Indian pennywort for practical utilization, 8 th international conference on CCSN2019, Vol-1, October, 19th-20th, 2019, Institute of Aeronautical Engineering, Hyderabad, India.
160. M. Hazrat Ali, Unesco Chakma, Debashis Howlader, M.Tawhidul Islam and **K.A.Khan** (2019) Studies on Performance Parameters of a Practical Transformer for Various Utilizations , 8 th international conference on CCSN2019, Vol-1, October, 19th-20th, 2019, Institute of Aeronautical Engineering, Hyderabad, India.
161. **K.A.Khan**, Md. Shahariar Rahman, Ali Akter , Md. Shahidul Hoque, Md. Jahangir Khan, Eiskandar Mirja, Md. Nasiruddin Howlader, Mohammed Solaiman(2019) A study on the effect of embedded surface area of the electrodes for voltage collection from living PKL tree, 5(6) , IJARIE-ISSN(O)-2395-4396
162. **K.A.Khan** and S.M.Zian Reza(2019) A Study on Maximum Power Harvesting Potential from living PKL tree - Future Energy Resource for the Globe, 5(6), PP:893-903, IJARIE-ISSN(O)-2395-4396
163. M.Hazrat Ali, Unesco Chakma,Debashis Howlader, M. Tawhidul Islam and **K.A.Khan**(2019) Studies on Performance Parameters of a Practical Transformer for Various Utilizations, Microsystem Technologies, Springer, Accepted:03 Dec 2019, DOI: 10.1007/s00542-019-04711-w
164. **K.A.Khan**(2019) Impact of Electrode Surface for Voltage Cultivation from Living PKL Tree, International Journal of Nanotechnology in Medicine & Engineering, 4(5), November 2019
165. **K.A.Khan** and M. Abu Salek(2019),Future Trends in Vegetative and Fruits Energy- A New Renewable Energy Source for Future Electricity,IJARIE,5(6), pp:1144-1160
166. **K.A.Khan**, Alamgir Kabir, Anowar Hossain, Nazmul Alam, Abhijeet Kumar Kundu, Ali Akter (2019) A comparative Study between Lead Acid and PKL Battery, IJARIE,5(6), pp:1439-1454
167. **M. K. A. Khan**, A. Rahman, S. Paul, M. S. Rahman, M. T. Ahad and M. Al Mamun (2019), "An Investigation of Cell Efficiency of Pathor Kuchi Leaf (PKL) Cell for Electricity Generation," 2019 International Symposium on Advanced Electrical and Communication Technologies (ISAECT), Rome, Italy, 2019, pp. 1-6.
168. Dr. A K M Obaydullah, Dr. K.A. Khan (2020) Perception of head teachers of primary schools about quality primary science teaching-learning (TL) practice in Bangladesh, SPC Journal of Education, Science Publishing Corporation Publisher of International Academic Journals, DOI: [10.14419/je.v3i1.30593](https://doi.org/10.14419/je.v3i1.30593), Vol(3),No(1),Pages:18-21.

169. **K. A. Khan**, Md. Alamgir Kabir , Mustafa Mamun, Md. Anwar Hossain, Samiul Alim(2020),An Observation of Solar Photovoltaic Electricity across the globe, IJARIE,6(4), pp:1487-504, ISSN(O)-2395-4396
170. **K.A.Khan** (2020) PKL Electrochemical Cell -A New and Innovative Clean Energy Production System, Hendun Research Access, NTNS, 3(1), pp: 73-78
171. **K.A.Khan**, M Shaiful Islam, M.N. Islam Khan, Atique Ullah, Shahinul Islam, S. R. Rasel (2020), Zinc Oxide Nanoparticles Production Using *Catharanthus Roseus* Leaf Extract and their Characterization for Practical Utilization, Proceeding of 7th International Conference on Microelectronics, Circuits & Systems,MICRO-2020, 25th and 26th of July, 2020.Venue: Online Conference, In Collaboration with: Delhi Technological University, Delhi, India.
172. **K.A.Khan**, M Shaiful Islam, Md. Abdul Awal, M.N. Islam Khan, Atique Ullah(2020), Studies on Performances of Copper Oxide Nanoparticles from *Catharanthus Roseus* Leaf Extract, Proceeding of 7th International Conference on Microelectronics, Circuits & Systems,MICRO-2020, 25th and 26th of July, 2020.Venue: Online Conference, In Collaboration with: Delhi Technological University, Delhi, India.
173. Salman Rahman Rasel and **K. A. Khan** (2020), A Study on Electrochemical Cell based on soil and living PKL tree, Proceeding of 7th International Conference on Microelectronics, Circuits & Systems,MICRO-2020, 25th and 26th of July, 2020.Venue: Online Conference, In Collaboration with: Delhi Technological University, Delhi, India.
174. Lovelu Hassan & **K. A. Khan** (2020), Applications of PKL electricity for use in DC instruments, Proceeding of 7th International Conference on Microelectronics, Circuits & Systems,MICRO-2020, 25th and 26th of July, 2020.Venue: Online Conference, In Collaboration with: Delhi Technological University, Delhi, India.
175. **K.A. Khan** and Md. Abdul Awal (2020), A study on connection between chemistry and electricity, IJARIE-ISSN(O)-2395-4396, Vol-6 Issue-5 2020.
176. K.A.Khan, M.A.Mamun and Sharif Mia(2020), Electrochemical conversion of CO₂ into useful chemicals and PKL electricity, Abstract Published, Proceedings of 9th International Conference on Computing, Communication and Sensor Networks 17th and 18th of October, Organizer: Applied Computer Technology Kolkata, West Bengal, India. www.actsoft.org In Association with: International Association of Science, Technology and Management,Page-19,Venue: Online conference.
177. **K.A.Khan** and Shahinul Islam(2020), 3R economy of the PKL electrochemical cell, Abstract Published, Proceedings of 9th International Conference on Computing, Communication and Sensor Networks 17th and 18th of October, Organizer: Applied Computer Technology Kolkata, West Bengal, India. www.actsoft.org In Association with: International Association of Science, Technology and Management, Page-26 , Venue: Online conference.
178. **K.A. Khan**, and Md. Abdul Awal. "A Study on Graphite, Graphene, Graphene Oxide (GO) and Reduced Graphene Oxide (rGO) for Practical Utilization" Internation Journal Of Advance Research And Innovative Ideas In Education Volume 6 Issue 6 2020 Page 422-434
179. **K.A. Khan**, Syful islam , and Md. Abdul Awal(2020) "A historical review on silver nanoparticles (AgNPs) synthesis for different leaf, vegetative and plant extracts" Internation Journal Of Advance Research And Innovative Ideas In Education Volume 6 Issue 6 2020 Page 705-724
180. **K.A. Khan** , Shahinul Islam, S. R. Rasel, M. A.Saime, Sazzad Hossain, Md. Atiqur Rahman (2020) Erformance Evaluation Of Pkl (Pathor Kuchi Leaf) Electricity For Use In Television And Radio, Information Management and Computer Science (IMCS) 3(2) (2020) 30-37, DOI: <http://doi.org/10.26480/imcs.02.2020.30.37>
181. **K.A. Khan**, Samiul Alim, Md Khairul Islam, and Sayed Bony Amin. "Living PKL Plants - An Innovative Idea for PKL back up LED lamp along the Coastal Belts of Bangladesh" ,Internation Journal Of Advance Research And Innovative Ideas In Education Volume 7 Issue 2 2021 Page 112-127
182. **K.A. Khan**, Shahinul Islam, M. A. Saime, S. R. Rasel, Sazzad Hossain(2021) A NEW AND SUSTAINABLE PKL ELECTRICITY, Topics in Intelligent Computing and Industry Design (ICID) 2(2) (2020) 173-178, DOI: <http://doi.org/10.26480/etit.02.2020.173.178>
183. Md. Ohiduzzamana, Rajia Sultanab, Rajada Khatunc, Shirin Akterc and **K.A.Khan**(2021) PORTABLE PKL POWERED LANTERN, Topics in Intelligent Computing and Industry Design (ICID) 2(2) (2020) 179-183, DOI: <http://doi.org/10.26480/etit.02.2020.179.183>
184. **K.A. Khan**, Md. Robiul Islam, Md. Anwar Hossain , and Md. Sayed Hossain. "PKL electricity- A new idea on Zn/Cu based electrochemical cell" Internation Journal Of Advance Research And Innovative Ideas In Education Volume 7 Issue 2 2021 Page 641-655
185. **K.A. Khan**, Md. Anwar Hossain, Md. Robiul Islam , and Md. Abdul Mannan. "A study on Zn/C based Pathor Kuchi Leaf (PKL) electrochemical cell" Internation Journal Of Advance Research And Innovative Ideas In Education Volume 7 Issue 2 2021 Page 975-990
186. **K.A Khan**,Md. Sayed Hossain,Salman Rahman Rasel, Shahinul Islam,M.Hazrat Ali(2021) A study on Zn/Cu based pandan leaf (Pandanus amaryllifolius)electrochemical cell, 8 th international conference on Micro2021, Microelectronics, Circuits and Systems, May 08th and 09th 2021, Page 15, Venue: Online conference.

187. **K.A.Khan**, Farhana Islam, Md. Sayed Hossain, Salman Rahman Rasel (2021), Studies on synthesis, characterization and monitoring of Ag NPs for power production using tomato, 8 th international conference on Micro2021, Microelectronics, Circuits and Systems, May 08th and 09th 2021, Page 18, Venue: Online conference.
188. **K.A.Khan**, Farhana Islam, Md. Sayed Hossain, Salman Rahman Rasel (2021) A Study on Electricity Generation from Red Spinach, 8 th international conference on Micro2021, Microelectronics, Circuits and Systems, May 08th and 09th 2021, Page 22, Venue: Online conference.
189. **K.A.Khan**, Mohammad Tofazzal Haider, Md. Sayed Hossain, Salman Rahman Rasel (2021) Synthesis, Characterizations of Silver Nanoparticles (Ag NPs) and monitoring for power production using Drum Stick Leaves, 8 th international conference on Micro2021, Microelectronics, Circuits and Systems, May 08th and 09th 2021, Page 31, Venue: Online conference.
190. **K.A.Khan**, Shahinul Islam, Md. Sayed Hossain, Salman Rahman Rasel (2021) Extract of Green Chili: A new source of electricity, 8 th international conference on Micro2021, Microelectronics, Circuits and Systems, May 08th and 09th 2021, Page 35, Venue: Online conference.
191. **K.A. Khan**, Md. Anowar Hossain, Md. Abdul Mannan, and Md. Robiul Islam. "PKL electrochemical cell and battery-The influence of equilibrium constant" *International Journal Of Advance Research And Innovative Ideas In Education* Volume 7 Issue 3 2021 Page 2446-2491
192. **K.A. Khan**, Md. Khairul Islam, Md. Alamgir Kabir, Sayed Bony Amin, Sazzad Hossain, and Md. Shahidul Islam. "A study on variation of product ion and reactant ion during PKL electricity generation" *International Journal Of Advance Research And Innovative Ideas In Education* Volume 7 Issue 4 2021 Page 579-597
193. **193. K.A. Khan**, Md. Alamgir Kabir, Mustafa Mamun, Sazzad Hossain, and Md. Shahidul Islam. "PKL electricity - The Role of Physics" *International Journal Of Advance Research And Innovative Ideas In Education* Volume 7 Issue 4 2021 Page 1583-1616 *Of Advance Research And Innovative Ideas In Education* Volume 7 Issue 5 2021 Page 563-582
194. **K.A. Khan**, Md. Alamgir Kabir, Mustafa Mamun, Mst. Sakera Khatun, and Muhammad Saiful Islam Akhand. "Effect of pH of the PKL extract during electricity production" *International Journal Of Advance Research And Innovative Ideas In Education* Volume 7 Issue 5 2021 Page 583-600
195. **K.A. Khan**, Khairul Islam, Sayed Bony Amin, and Khandaker Kabir Hossain. "A study on current density for PKL electrochemical cell" *International Journal Of Advance Research And Innovative Ideas In Education* Volume 7 Issue 6 2021 Page 9-24
196. Motiur Rahman, M Shamsuzzaman, Manoshi Sarker, Abdul Jobber, Mohsin Mia, Asish Kumar Bairagi, Musfika Ahmed, Shohel Reza, Sadiq R Malik, MMH Bhuiyan, ASM Habibullah Khan and **MKA Khan** (2021), Dosimetric characterization of medical linear accelerator Photon and Electron beams for the treatment accuracy of cancer patients, *World Journal of Advanced Engineering Technology and Sciences*, 2021, 03(01),041–059, Publication history: Received on 04 May 2021; revised on 11 August 2021; accepted on 13 August 2021, Article DOI: <https://doi.org/10.30574/wjaets.2021.3.1.0046>
197. **K.A. Khan**, Akhtar-Uz-Zaman Shabuj, Md. Khairul Islam, Sayed Bony Amin, & Md. Abdur Rahim. (2021). AgNPs for Power Production. *International Journal Of Advance Research And Innovative Ideas In Education*, 7(6), 323-338.
198. **K.A. Khan**, & Md. Akhtar-Uz-Zaman Shabuj. (2021). A study on quantum dot NPs for drug delivery. *International Journal Of Advance Research And Innovative Ideas In Education*, 7(6), 622-637.
199. **K.A. Khan**, khairulislam, Sayed Bony Amin, & Akhtar-Uz-Zaman Shabuj. (2021). A Brief Study on Nanofluid. *International Journal Of Advance Research And Innovative Ideas In Education*, 7(6), 1151-1165.
201. Md Rabiul Alam & **K.A. Khan** (2021). Development of Antigravity Device (Ion Propulsion Method) using Artificial Intelligence. *International Journal Of Advance Research And Innovative Ideas In Education*, 7(6), 1128-1150.
- 202.Khan K.A.**, Bhuyan MS., Mamun M A., Ibrahim M., Hasan L., Wadud M.A.(2018), Organic Electricity from Zn/Cu-PKL Electrochemical Cell, In: *Contemporary Advances in Innovative and Applicable Information Technology, Advances in Intelligent Systems and Computing*, J. K. Mandal et al. (eds.), © Springer Nature Singapore Pvt. Ltd., 2018, Vol. 812, Chapter 9, p 75-90.
203. **Kamrul Alam Khan**, Salman Rahman Rasel, S.M. Zian Reza and Farhana Yesmin (March 25th 2020). Energy Efficiency and Sustainability in Outdoor Lighting - A Bet for the Future, *Energy Efficiency and Sustainable Lighting - a Bet for the Future*, Manuel Jesús Hermoso-Orzáez and Alfonso Gago-Calderón, IntechOpen, DOI: 10.5772/intechopen.89413.
- 204. K.A.Khan**, Farhana Yesmin, Md. Abdul Wadud and A K M Obaydullah (2019), "Performance of PKL Electricity for Use in Television", accepted as a book chapter NAROSA publisher, September 2019.

205. M. N. F.Rab, **K. A. Khan**, Salman Rahman Rasel, M.Hazrat Ali, Lovelu Hassan , M. Abu Salek , S.M.Zian Reza and M Ohiduzzaman(2020) “Voltage Cultivation from Fresh Leaves of Air Plant, Climbing Spinach, Mint, Spinach and Indian Pennywort for Practical Utilization”, Energy Systems, Drives andAutomations, Springer Singapore, [Lecture Notes in Electrical Engineering](#), eBook ISBN: 978-981-15-5089-8, DOI: 10.1007/978-981-15-5089-8, Hardcover ISBN: 978-981-15-5088-1, Series ISSN: 1876-1100, Volume: 664,Page: 150-160.
206. **K. A. Khan**, Salman Rahman Rasel, S.M.Zian Reza, M. A. Saime, Nazmul Alam` Abu Salek , MehediHasan (2020) “Solar Medical Sterilizer using Pressure Cooker for Rural off-grid Areas”, Energy Systems, Drives andAutomations, Springer Singapore, [Lecture Notes in Electrical Engineering](#), eBook ISBN: 978-981-15-5089-8, DOI: 10.1007/978-981-15-5089-8, Hardcover ISBN: 978-981-15-5088-1, Series ISSN: 1876-1100, Volume: 664,Page: 258-269.
207. **K. A. Khan**, M. A. Saime, M.Hazrat Ali, S. M. Zian Reza, Nazmul Alam, Md. Afzol Hossain, M. N.F.Rab and Shahinul Islam (2020) “A study on PKL electrochemical cell for three different conditions ”, Energy Systems, Drives andAutomations, Proceedings of ESDA 2019 , Springer Singapore, [Lecture Notes in Electrical Engineering](#), eBook ISBN: 978-981-15-5089-8, DOI: 10.1007/978-981-15-5089-8, Hardcover ISBN: 978-981-15-5088-1, Series ISSN: 1876-1100, Volume: 664, Page: 374-386.
208. **Khan K.** et al. (2020) A Study on Development of PKL Power. In: Mandal J.K., Mukherjee I., Bakshi S., Chatterji S., Sa P.K. (eds) Computational Intelligence and Machine Learning. Advances in Intelligent Systems and Computing, vol 1276. Pp151-171, Springer, Singapore. http://doi-org-443.webvpn.fjmu.edu.cn/10.1007/978-981-15-8610-1_17
209. Pervin R., **Khan K.A.**, Khan N.I., Atique Ullah A.K.M., Zian Reza S.M. (2021) Green Synthesis of Magnetite (Fe₃O₄) Nanoparticles Using Azadirachta indica Leaf Extract and Their Characterization. In: Mukherjee M., Mandal J., Bhattacharyya S., Huck C., Biswas S. (eds) Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering. Springer, Singapore. https://doi.org/10.1007/978-981-33-6915-3_9, First Online17 June 2021, DOIhttps://doi.org/10.1007/978-981-33-6915-3_9, Publisher NameSpringer, Singapore. Page: 81-90
210. **Khan K.A.**, Sultana R., Islam S., Zian Reza S.M. (2021) A Study on Light Traps for Attracting and Killing the Insects Using PKL Electricity. In: Mukherjee M., Mandal J., Bhattacharyya S., Huck C., Biswas S. (eds) Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering. Springer, Singapore. https://doi.org/10.1007/978-981-33-6915-3_14, First Online17 June 2021, DOIhttps://doi.org/10.1007/978-981-33-6915-3_14, Publisher NameSpringer, Singapore.pp:135-143
211. Hossain M.A. et al. (2021) PKL Electricity-An Observations. In: Mukherjee M., Mandal J., Bhattacharyya S., Huck C., Biswas S. (eds) Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering. Springer, Singapore. , pp:191-202
214. **Khan K.A.**, Shahttps://doi.org/10.1007/978-981-33-6915-3_53, First Online17 June 2021, DOIhttps://doi.org/10.1007/978-981-33-6915-3_53, Publisher NameSpringer, Singapore.pp: 555-566
212. **Khan K.A.**, Rahman M.S., Rahman M.N., Khan S.A., Juel M.I., Nirjhar M.I. (2021) A Study on Electrochemical Characterizations of Bryophyllum pinnatum Leaf Electricity. In: Mukherjee M., Mandal J., Bhattacharyya S., Huck C., Biswas S. (eds) Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering. Springer, Singapore. https://doi.org/10.1007/978-981-33-6915-3_54 , First Online17 June 2021, DOIhttps://doi.org/10.1007/978-981-33-6915-3_54, Publisher NameSpringer, Singapore. pp 567-581
213. Hassan L., **Khan K.A.** (2021) Applications of PKL Electricity for Use in DC Instruments. In: Biswas A., Saxena R., De D. (eds) Microelectronics, Circuits and Systems. Lecture Notes in Electrical Engineering, vol 755. Springer, Singapore. https://doi.org/10.1007/978-981-16-1570-2_18iful Islam M., Awal A., Khan M.N.I., Ullah A.K.M.A. (2021) Studies on Performances of Copper Oxide Nanoparticles from Catharanthus Roseus Leaf Extract. In: Biswas A., Saxena R., De D. (eds) Microelectronics, Circuits and Systems. Lecture Notes in Electrical Engineering, vol 755. Springer, Singapore. https://doi.org/10.1007/978-981-16-1570-2_17,pp:179-190
215. **Khan K.A.**, Islam S., Delowar Hossain Munna M., Zian Reza S.M., Hazrat Ali M., Yesmin F. (2022) 3R Economy of a PKL Electrochemical Cell. In: Chanda C.K., Szymanski J.R., Sikander A., Mondal P.K., Acharjee D. (eds) Advanced Energy and Control Systems. Lecture Notes in Electrical Engineering, vol 820. Springer, Singapore. https://doi.org/10.1007/978-981-16-7274-3_11
219. **Khan K.A.**, Islam S., Rasel S.R., Saime M.A., Islam S., Ali M.H. (2022) PKL Backup LED Bulb-An Alternative Source of Electricity During Load Shading. In: Chanda C.K., Szymanski J.R., Sikander A., Mondal P.K., Acharjee D. (eds) Advanced Energy and Control Systems. Lecture Notes in Electrical Engineering, vol 820. Springer, Singapore. https://doi.org/10.1007/978-981-16-7274-3_7

220. **Khan K.A.**, Mamun M.A., Adal M.I., Mia S., Ali M.H. (2022) Electrochemical Conversion of CO₂ into Useful Chemicals and PKL Electricity. In: Chanda C.K., Szymanski J.R., Sikander A., Mondal P.K., Acharjee D. (eds) Advanced Energy and Control Systems. Lecture Notes in Electrical Engineering, vol 820. Springer, Singapore. https://doi.org/10.1007/978-981-16-7274-3_5

221. **Khan KA** (2008) Patent as an Inventor, Electricity Generation form Pathor Kuchi Leaf (PKL), Publication date 2008/12/31, Patent number BD 1004907

222. **Khan DMKA** (1997) Patent as an Inventor, Production of Soap by Solar System. Patent Serial No. 10029941

223. **Khan DMKA** (1999) Patent as an Inventor, Improvement in or Relating to Production

of Candles by Solar System. Patent Serial No. 1003287

224. **Khan DMKA** (2001) Patent as an Inventor, Medical Sterilizer by Solar System. Patent Serial No. 1003646