

CURRICULUM VITAE

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Academic Qualifications:

- B.Sc.(Hons.), Physics Honours (1st), 1980, Dhaka University, Bangladesh
- M.Sc. (Solid State Physics), 1st class, 1982, Dhaka University, Bangladesh
- Ph.D. (Semiconductor Physics), 1991, Osaka University, Osaka, Japan

Professional Qualifications/Memberships: (State date of membership)

- Senior Member, IEEE, USA 1999 - present
- Member, Jpn. Society of Appl. Phys., Japan 1991 – 1998
- Member, Jpn. Society of Physics, Japan 1988 – 1995
- Member, Materials Research Society, Singapore 2003 – 2008

Summary of Working Experience:

I obtained my PhD degree in March 1991 in Semiconductor Physics from the Osaka University, Osaka, Japan. Before moving to Japan I worked on MBE grown III-V semiconductor materials and devices in Chalmers University of Technology, Sweden for about two years and on silicon solar cell in Atomic Energy Research Center, Dhaka, Bangladesh. After my PhD I joined at the R&D center of Toshiba Corporation, Japan as semiconductor materials and devices research scientist (1991 – 1997). There I worked on opto-electronic devices for about three years and then I worked on poly-Si thin film transistor (TFT) to develop a process technology on glass substrate for the fabrication of flat panel display (LCD type). In 1997 I migrated to Australia from Japan and worked on III-V semiconductor laser diodes in the Australian National University, Canberra. I worked at the School of Materials Science and Engineering (MSE), Nanyang Technological University (NTU), Singapore as an Assistant Professor from 1 July 2001 to 30 June 2007. Then I worked in the Department of Electrical and Computer Engineering, King Abdulaziz University, Jeddah, Saudi Arabia as an Associate Professor from August 2007 to December 2008. Now I am working in the School of Photovoltaic and Renewable Energy Engineering, the University of New South Wales (UNSW) as an Associate Professor. I have published over 180 research papers in different international

journals and in conference proceedings. I have 17 patents. **Toshiba Corporation, Japan is using two of my patents (Jpn. Patent 1995-94773, US Patent 5,581,087) for their commercial products.**

Publication List:

Book Chapters: 4

Number of journal papers: 137 + 4 (under review); Total = 141

Number of conference papers: 103 + 30(not listed)

Number of patents: 17

Total Citation of papers: 4,280

H-index: 28

(a) Book Chapters:

5. **Uddin A**, 2018, 'Perovskite solar cells', in Materials and Energy, World Scientific Publishing Co, pp. 285 - 367, http://dx.doi.org/10.1142/9789813239494_0009
4. **Ashraf Uddin**, Chapter 9, "Perovskite Solar Cells", World Scientific Handbook of Organic Optoelectronic Devices, Volume 1, Jinsong Huang, et al. (Eds), publisher World Scientific, (2017) p285 – 368. [ISBN:
3. **Ashraf Uddin** and Martin A. Green, "Donor-Acceptor Interface and Conversion Efficiency", "Advances in Materials Science Research; Volume 16, Edited by Maryann C. Wythers, published by Nova Science Publishers, Inc. Hauppauge, NY, (2013) P 149-174. [ISBN: 978-1-62618-302-5]
2. **Ashraf Uddin**, Chapter 5 "Photovoltaic Devices" "Handbook of Research on Solar Energy Systems and Nanotechnology", Edited by Dr. Sohail Anwar, Dr. Salahuddin Qazi, and Dr. Harry Efstathiadis, published by IGI Global publisher, USA (2013) P126 - 162. [ISBN13: 978-1-46661-996-8]
1. **Ashraf Uddin**, Chapter 1 "Doping of Organic Electronic Materials" "Doping: Properties, Mechanism and Applications", Edited by Dr Lixin Yu, published by Nova Science Publishers, Inc. Hauppauge, NY (2013) P1 - 50. [ISBN-13: 978-1-62618-105-2]

(b) Journal Papers:

137. Leiping Duan, Yu Zhang, Mingrui He, Rong Deng, Haimang Yi, Qingyai Wei, Yingping Zou, and **Ashraf Uddin**, “Burn-in Degradation Mechanism Identified for Small Molecular Acceptor based High-efficiency Non-fullerene Organic Solar Cells”, *ACS Applied Materials & Interfaces* (accepted on 22 May 2020)
136. Haimang Yi, Leiping Duan, Faiazul Haque, Jueming Bing, Jianghui Zheng, Yilin Yang, Alvin Cheuk-him Mo, Yu Zhang, Cheng Xu, Gavin Conibeer, **Ashraf Uddin**, “Thiocyanate assisted nucleation for high performance mix-cation perovskite solar cells with improved stability”, *Vacuum* 178 (2020) p109441.
135. Leiping Duan, Yu Zhang, Rong Deng, Haimang Yi, and **Ashraf Uddin**, “The Balance between Energy Transfer and Exciton Separation in Ternary Organic Solar Cells with Two Conjugated Polymer Donor”, *ACS Appl. Energy Mater.*, DOI: 10.1021/acsaem.0c00740.
134. Leiping Duan and **Ashraf Uddin**, “Progress in Stability of Organic Solar Cells”, April 2020, *Advanced Science* , DOI: [10.1002/advs.201903259](https://doi.org/10.1002/advs.201903259)
133. Faiazul Haque, Haimang Yi, Jihoo Lim, Leiping Duan, Hong Duc Pham, Prashant Sonar, **Ashraf Uddin**, “Small molecular material as an interfacial layer in hybrid inverted structure perovskite solar cells”, *Materials Science Semiconductor Processing* 108 (2020) p104908.
132. Leiping Duan, Mina Guli, Yu Zhang, Haimang Yi, Faiazul Haque, **Ashraf Uddin**, “The Air Effect in the Burn-In Thermal Degradation of Nonfullerene Organic Solar Cells”, *Energy Technol.* 8 (2020) p1901401.
131. MB Upama, MA Mahmud, G Conibeer, **A Uddin**, “Trendsetters in High-Efficiency Organic Solar Cells: Toward 20% Power Conversion Efficiency”, *SOLAR RRL*, 2019. DOI: 10.1002/solr.201900342
130. Leiping Duan, Yu Zhang, Haimang Yi, Faiazul Haque, Cheng Xu, Shaozhou Wang and Ashraf Uddin “Thermal annealing dependent dielectric properties and energetic disorder in PffBT4T-2OD based organic solar cells”, *Materials Science in Semiconductor Processing* 105, (2020) p 104750
129. Leiping Duan, Haimang Yi, Zhimeng Wang, Yu Zhang, Faiazul Haque, Borong Sang, Rong Deng and **Ashraf Uddin**, “Semitransparent organic solar cells based on PffBT4T-2OD with a thick active layer and near neutral colour perception for window applications”, *Sustainable Energy Fuels* 3 (2019) p2456-2463.
128. Leiping Duan, Cheng Xu, Haimang Yi, Mushfika Baishakhi Upama, Md Arafat Mahmud, Dian Wang, Faiazul Haque, and **Ashraf Uddin**, “Non-Fullerene-Derivative-Dependent Dielectric Properties in High-Performance Ternary Organic Solar Cells”, *IEEE*

127. Haimang Yi, Dian Wang, Leiping Duan, Faiazul Haque, Cheng Xu, Yu Zhang, Gavin Conibeer, Ashraf Uddin, "Solution-processed WO₃ and water-free PEDOT: PSS composite for hole transport layer in conventional perovskite solar cell", *Electrochimica Acta* 319 (2019) p349-358.
126. Leiping Duan, Yu Zhang, Haimang Yi, Faiazul Haque, Rong Deng, Huilan Guan, Yingping Zou, **Ashraf Uddin**, "Trade-Off between Exciton Dissociation and Carrier Recombination and Dielectric Properties in Y6-Sensitized Nonfullerene Ternary Organic Solar Cells", *Energy Technol.* (2019) p1900924. DOI: 10.1002/ente.201900924
126. Faiazul Haque, Haimang Yi, Leiping Duan, Yu Zhang, Matthew Wright, Gavin Conibeer and Ashraf Uddin, "Optimisation of annealing temperature for low temperature processed inverted structure Caesium Formamidinium Lead Triiodide perovskite solar cells", *Materials Science in Semiconductor Processing* 102, (2019) p104580.
125. Leiping Duan, Xianyi Meng, Yu Zhang, Haimang Yi, Ke Jin, Faiazul Haque, Chen Xu, Zuo Xiao, Liming Ding and **Ashraf Uddin**, "Comparative analysis of burn-in photo-degradation in non-fullerene CO₈DFIC acceptor based high-efficiency ternary organic solar cells", *Mater. Chem. Front.*, 3 (2019) p1085-1096.
124. **Ashraf Uddin**, Mushfika Baishakhi Upama, Haimang Yi, Leiping Duan, "Encapsulation of Organic and Perovskite Solar Cells: A Review", *Coatings* 9 (2019) p65.
123. Leiping Duan, Haimang Yi, Yu Zhang, Faiazul Haque, Cheng Xu, **Ashraf Uddin**, "Comparative study of light and thermal induced degradation for both fullerene and non-fullerene based organic solar cells", *Sustainable Energy & Fuels* (2019); DOI: 10.1039/C8SE00567B
122. Leiping Duan, Naveen Kumar Elumalai, Yu Zhang, **Ashraf Uddin**, "Progress in non-fullerene acceptor based organic solar cells", *Solar Energy Materials and Solar Cells* 193 (2019) p22 – 65.
121. Mushfika Baishakhi Upama, Md Arafat Mahmud, Haimang Yi, Naveen Kumar Elumalai, Gavin Conibeer, Dian Wang, Cheng Xu, **Ashraf Uddin**, "Low-temperature processed efficient and colourful semitransparent perovskite solar cells for building integration and tandem applications", *Organic Electronics* 65 (2019) p401 – 411.
120. Leiping Duan, Haimang Yi, Cheng Xu, Mushfika Baishakhi Upama, Md Arafat Mahmud, Dian Wang, Faiazul Haque Shabab, and **Ashraf Uddin**, "Relationship between the diode ideality factor and the carrier recombination resistance in organic solar cells", *IEEE Journal of Photovoltaics* 8 (2018) p1701 - 1709. [IF: 3.1]
119. Faiazul Haque, Matthew Wright, Md Arafat Mahmud, Haimang Yi, Dian Wang, Leiping Duan, Cheng Xu, Mushfika Baishakhi Upama, **Ashraf Uddin**, "Effects of Hydroiodic Acid Concentration on the Properties of CsPbI₃ Perovskite Solar Cells", *ACS*

Omega 3 (2018) p11937–11944. [IF: TBA]

118. Md Arafat Mahmud, Naveen Kumar Elumalai, Bhupendar Pal, Rajan Jose, Mushfika Baishakhi Upama, Dian Wang, Vinicius R. Gonçales, Cheng Xu, Faiazul Haque, and **Ashraf Uddin**, “Electrospun 3D composite nano-flowers for high performance triple-cation perovskite solar cells”, *Electrochimica Acta* 289 (2018) 459 - 473. [IF: 5.1]
117. Mushfika Baishakhi Upama, Naveen Kumar Elumalaib, Md Arafat Mahmuda, Cheng Xua, Dian Wang, Matthew Wright, **Ashraf Uddin**, “Enhanced electron transport enables over 12% efficiency by interface engineering of non-fullerene organic solar cells”, *Solar Energy Materials and Solar Cells* 187 (2018) 273–282.
116. **Ashraf Uddin**, Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Faiazul Haque, Cheng Xu, “Low Temperature Processed Efficient and Stable Perovskite Solar Cell, *Adv. Mater. Lett.* 10 (2019) p98 -106.
115. Haimang Yi, Dian Wang, Md Arafat Mahmud, Faiazul Haque, Mushfika Baishakhi Upama, Cheng Xu, Leiping Duan, and **Ashraf Uddin**, “Bilayer SnO₂ as Electron Transport Layer for Highly Efficient Perovskite Solar Cells”, *ACS Appl. Energy Mater.* 1 (2018) p6027–6039.
114. Ashraf Uddin, Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Faiazul Haque, Cheng Xu, “Low Temperature Processed Efficient and Stable Perovskite Solar Cell, *Adv. Mater. Lett.* (in press).
113. MA Mahmud, NK Elumalai, MB Upama, D Wang, VR Gonçales, M Wright, A Uddin, “Cesium compounds as interface modifiers for stable and efficient perovskite solar cells”, *Solar Energy Materials and Solar Cells* 174 (2018) 172-186.
112. D Wang, NK Elumalai, MA Mahmud, M Wright, MB Upama, KH Chan, A Uddin, “V₂O₅-PEDOT: PSS bilayer as hole transport layer for highly efficient and stable perovskite solar cells”, *Organic Electronics* 53 (2018) 66-73.
111. Cheng Xu, Matthew Wright, Duanlei Ping, Haimang Yi, Xueyun Zhang, MD Arafat Mahmud, Kaiwen Sun, Mushfika Upama, Faiazul Haque, Ashraf Uddin, “Ternary blend organic solar cells with a non-fullerene acceptor as a third component to synergistically improve the efficiency”, *Organic Electronics* 62 (2018) 261–268.
110. Cheng Xu, Matthew Wright, Naveen Kumar Elumalai, Md Arafat Mahmud, Vinicius R Gonçales, Mushfika B Upama, Ashraf Uddin, “Optimization of conjugated polymer blend concentration for high performance organic solar cells”, *Journal of Materials Science: Materials in Electronics*
<https://doi.org/10.1007/s10854-018-9735-3>.
109. F Haque, NK Elumalai, M Wright, MA Mahmud, D Wang, MB Upama, C Xu, A Uddin, “Annealing induced microstructure engineering of antimony tri-selenide thin films”, *Materials Research Bulletin* 99 (2018) 232-238

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107. Zinab H Bakr, Qamar Wali, Jamil Ismail, Naveen Kumar Elumalai, Ashraf Uddin, Rajan Jose, “Data of chemical analysis and electrical properties of SnO₂-TiO₂ composite nanofibers”, *Data in Brief* 18 (2018) p860 – 863. [IF: 5.2; Citations: 1]
106. Cheng Xu, Matthew Wright, Naveen Kumar Elumalai, Md Arafat Mahmud, Dian Wang, Mushfika Baishakhi Upama, Faiazul Haque, **Ashraf Uddin**, “Highly crystalline bilayer electron transport layer for efficient conjugated polymer solar cells”, *Current Applied Physics* 18 (2018) p505 – 511. [IF: 5.2; Citations: 1]
105. M.A. Mahmud, N.K. Elumalai, M.B. Upama, D. Wang, V.R. Goncales, M. Wright, C. Xu, F. Haque, **A. Uddin**, "Passivation of Interstitial and Vacancy Mediated Trap-states for Efficient and Stable Triple-Cation Perovskite Solar Cells," *Journal of Power Sources* 383 (2018) p59 - 71. [IF: 5.2; Citations: 1]
104. Zinab H. Bakr, Qamar Wali, Jamil Ismail, Naveen Kumar Elumalai, **Ashraf Uddin**, Rajan Jose, “Synergistic combination of electronic and electrical properties of SnO₂ and TiO₂ in a single SnO₂-TiO₂ composite nanofiber for dye-sensitized solar cells”, *Electrochimica Acta* 263 (2018) p524 – 532.
103. Qamar Wali, Naveen Kumar Elumalai, Yaseen Iqbal, **Ashraf Uddin**, Rajan Jose, “Tandem perovskite solar cells”, *Renewable and Sustainable Energy Reviews* 84 (2018) p89–110. [IF: 5.2; Citations: 1]
102. Mushfika Baishakhi Upama, Naveen Kumar Elumalai, Md Arafat Mahmud, Matthew Wright, Dian Wang, Cheng Xu, **Ashraf Uddin**, “Effect of annealing dependent blend morphology and dielectric properties on the performance and stability of non-fullerene organic solar cells”, *Solar Energy Materials and Solar Cells* 176 (2018) p109-118. [IF: 4.8]
101. Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Leila Zarei, Vinicius R. Gonçalves, Matthew Wright, Cheng Xu, Faiazul Haque and **Ashraf Uddin**, “Adsorbed carbon nanomaterials for surface and interface-engineered stable rubidium multi-cation perovskite solar cells”, *Nanoscale* 10 (2018) p773. [IF: 7.4]
100. Dian Wang, Naveen Kumar Elumalai, Md Arafat Mahmud, Matthew Wright, Mushfika Baishakhi Upama, Kah Howe Chan, Cheng Xu, Faiazul Haque, Gavin Conibeer, **Ashraf Uddin**, “V₂O₅-PEDOT: PSS bilayer as hole transport layer for highly efficient and stable perovskite solar cells”, *Organic Electronics* 53 (2017) p66-73. [IF: 3.4]
99. Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian

- Wang, Vinicius R Gonçales, Matthew Wright, John Justin Gooding, Faiazul Haque, Cheng Xu, **Ashraf Uddin**, “Cesium compounds as interface modifiers for stable and efficient perovskite solar cells”, *Solar Energy Materials and Solar Cells* 174 (2017) p172-186. [IF: 5.2; Citations: 1]
98. Faiazul Haque, Naveen Kumar Elumalai, Matthew Wright, Md Arafat Mahmud, Dian Wang, Mushfika Baishakhi Upama, Cheng Xu, **Ashraf Uddin**, “Annealing Induced Microstructure Engineering of Antimony Tri-selenide Thin Films”, *Materials Research Bulletin* 99 (2017) p232 – 238. [IF: 5.2; Citations: 1]
97. Mushfika Baishakhi Upama, Naveen Kumar Elumalai, Md Arafat Mahmud, Dian Wang, Faiazul Haque, Vinicius R Gonçales, J Justin Gooding, Matthew Wright, Cheng Xu, **Ashraf Uddin**, “Role of fullerene electron transport layer on the morphology and optoelectronic properties of perovskite solar cells” *Organic Electronics* 50 (2017) p279-289. [IF: 5.2; Citations: 1]
96. Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Arman Mahboubi Soufiani, Matthew Wright, Cheng Xu, Faiazul Haque, **Ashraf Uddin**, “Solution-Processed Lithium-Doped ZnO Electron Transport Layer for Efficient Triple Cation (Rb, MA, FA) Perovskite Solar Cells”, *ACS applied materials & interfaces* 9 (2017) p33841-33854. [IF: 5.2; Citations: 1]
95. Mushfika Baishakhi Upama, Naveen Kumar Elumalai, Md Arafat Mahmud, Matthew Wright, Dian Wang, Cheng Xu, Faiazul Haque, Kah Howe Chan, **Ashraf Uddin**, “Interfacial engineering of electron transport layer using Caesium Iodide for efficient and stable organic solar cells”, *Applied Surface Science* 416 (2017) p834-844. [IF: 5.2; Citations: 1]
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93. Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Faiazul Haque, Matthew Wright, Cheng Xu, **Ashraf Uddin**, “Controlled nucleation assisted restricted volume solvent annealing for stable perovskite solar cells”, *Solar Energy Materials and Solar Cells* 167 (2017) p70-86. [IF: 5.2; Citations: 1]
92. Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Binesh Puthen-Veetil, Faiazul Haque, Matthew Wright, Cheng Xu, Almantas Pivrikas, **Ashraf Uddin**, “Controlled Ostwald ripening mediated grain growth for smooth perovskite morphology and enhanced device performance”, *Solar Energy Materials and Solar Cells* 167 (2017) p87-101. [IF: 5.2; Citations: 1]
91. Mushfika Baishakhi Upama, Naveen Elumalai, Md Arafat Mahmud, Heng Sun, Dian Wang, Kah Howe Chan, Matthew Wright, Cheng Xu, **Ashraf Uddin**, “Organic solar cells with near 100% efficiency retention after initial burn-in loss

and photo-degradation”, *Thin Solid Films* 636 (2017) p127 – 136. [IF: 5.2; Citations: 1]

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89. Md Arafat Mahmud, Naveen Kumar Elumalai, Mushfika Baishakhi Upama, Dian Wang, Kah Howe Chan, Matthew Wright, Cheng Xu, Faiazul Haque, **Ashraf Uddin**, “Low temperature processed ZnO thin film as electron transport layer for efficient perovskite solar cells”, *Solar Energy Materials and Solar Cells* 159 (2017) p251-264. [IF: 5.2; Citations: 1]
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#**N.B:** I had more than 30 presentations in the Japan Society of Applied Physics and

Japan Society of Physics, meetings (half-yearly) during my 10 years research carriers in Japan, which are not listed here. Two pages short write-up for each presentation was published in the respective meeting proceeding.

(d) Some of the workshops:

5. **A. Uddin**, C. B. Lee and X. Hu “Fabrication of multi-color organic light emitting diodes”, CoE technology exhibition, 8 – 13 March 2005.
4. C. B. Lee, **A. Uddin** and X. Hu, “Investigation of Alq₃ Film Quality for Different Thermal Evaporation Rates”, Workshop on Thin Films organized by MPE/NTU, 8 – 9 January 2004.
3. T. Wong, **A. Uddin**, X. W. Sun and X. Hu, “Rare earth chelate complexes and electro-chemically deposited PBTh with nano-scale surface morphology”, Nano- science & nano-technology seminar, NUS, 27 Feb. 2004.
2. **A. Uddin**, X. Hu and C. B. Lee, “Organic semiconductor materials for advance foldable display”, CoE/NTU technology exhibition, 8 – 13 March 2004.
1. **A. Uddin**, “Deposition and investigation of electrical and optical properties of organic semiconductor materials”, A*star workshop, IMRE, 2 -3 October 2003.

(e) List of Patents:

17. **Ashraf Uddin** and Naveen Kumar Elumalai, “High Efficiency Organic–Silicon Tandem Solar Cells (the Technology)”, (UNSW Ref. 2017-077).
16. **Ashraf Uddin** and Naveen Kumar Elumalai, “A photovoltaic cell and a method of forming a photovoltaic cell”, US patent application (Application No. 15/503075, on 15 March 2017).
15. **Ashraf Uddin** and Naveen Kumar Elumalai, “A method of forming a light absorbing layer for a photovoltaic cell and a photovoltaic cell comprising the light-absorbing layer”, Australian provisional patent application (application number 2016904157 on 13/10/2016)
14. **Ashraf Uddin** and Naveen Kumar Elumalai, “A photovoltaic cell and a method of forming a photovoltaic cell”, ((application number 2016904145 on 13/10/2016)
13. **Ashraf Uddin**, “Application of graphene on perovskite solar cells (the ‘Technology’)”, (UNSW Ref. 2015-050).

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11. **Ashraf Uddin** "A photovoltaic cell and a method of forming a photovoltaic cell", patent no. WO 2016/023064 A1.
10. **Ashraf Uddin** and Lihui Song, "DESIGN OF HIGH EFFICIENCY ORGANIC SOLAR CELLS", submitted to NSi office, UNSW (Ref. 10-2560).
9. **Ashraf Uddin**, Alex See and Lap Chan, "HIGH PERFORMANCE STRAINED-Si CHANNEL MOSFET ON SiGe/SiO₂ LAYERS", (Patent is filed in US Patent Office, 2005).
8. **Ashraf Uddin**, "SILICON CARBIDE THIN FILM TRANSISTOR ON GLASS SUBSTRATE", (Patent was registered in Japan in 1997. I do not know the registration number as I have been out of Japan since Feb. 1997)
7. **Ashraf Uddin** and Fumio Ueno, "SILICON CARBIDE X- AND γ -RAYS DETECTORS", (Patent was registered in Japan in 1997. I do not know the registration number as I have been out of Japan since Feb. 1997)
6. **Uddin Ashraf** and Fumio Ueno, "RADIATION DETECTOR", US Patent no. # 5,581,087 (Dec. 3, 1996)
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2. **Ashraf Uddin**, "OHMIC CONTACTS AND EASY THERMO COMPRESSION BONDING TO ALPHA SILICON CARBIDE", Japanese Patent no. # 1994-94237
1. **Ashraf Uddin** and Tsutomu Uemoto, "GRADIENT DOPING HIGH EFFICIENT BLUE LIGHT EMITTING DIODE FORMED IN SILICON CARBIDE", Japanese Patent no. # 1993-304314

#N.B: Toshiba Corporation, Japan is using two of my patents 6 and 7 for their commercial products.