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Dr. Mohammad Kamal Hossain

Associate Professor (RE-II)

Interdisciplinary Research Center for Renewable Energy and Power Systems (IRC-REPS)
King Fahd University of Petroleum & Minerals, Saudi Arabia

Executive Summary

An independent researcher with astute analytical and problem-solving skills based on strong fundamentals of optoelectronics and nanoplasmonics. Self-motivated, open minded and a sincere researcher and academic with several years of experience in solar cell design, correlated spectroscopy and optometrology along with device fabrication, modeling and simulation. In particular,

- ✓ **Thin film and solar cell**: Smart and functional thin films for solar cell applications suitable for harsh weather conditions, particularly high temperature and UV-protection.
- ✓ **Characterization**: Optical, structural and topographical characterizations of smart and novel thin films. Plasmon excitation of nanomaterials, particularly 0D, 1D- and 2D nanomaterials suitable for plasmonic solar cell, plasmonic sensor, plasmonic catalyst, etc.
- ✓ **Simulation**: Multi-physics Simulation using Plank FDTD and Lumerical FDTD solution. DFT calculation using G09 and QE.

Education

- ❑ PhD Materials Science & Engineering (University of Tsukuba, Japan, 2007)
- ❑ M Engg MicroElectronics (AIT, Thailand, 2003)
- ❑ BSc Engg Electrical & Electronic (KUET, Bangladesh, 1999)

Distinguished Projects

- Development of Plasmonic Nanoscatterers: An Innovative Approach to Devise Efficient Thin Film Solar Cell. Role: PI, 3 years, KFUPM.
- Mono-(Cu, N) and Co-(Cu-N) Doped Metal Oxide: A Smart UV-Protective Layer for Photoactive Devices. Role: PI, 1.8 year, IRC-REPS.
- Nanostructured Protective Layer for Photovoltaic Applications Suitable under Harsh Weather conditions. Role: PI, 1 year, KACARE.
- Lead-free Organic-Inorganic Halide Perovskites for Solid State Solar Cell Application. Role: PI, 3 years, KFUPM.
- Detection and degradation of wastewater contaminants from refining industry using surface enhanced Raman scattering (SERS). Role: CoI, 3 years, NSTIP.
- Experimental and Modelling development of a new model using optical properties of stable nanofluids for solar thermal applications. Role: CoI, 3 years, KFUPM.
- In situ induced stress Raman spectroscopy measurements of a-Si:H thin films. Role: CoI, 1 year, MIT-KFUPM.
- Capacitance-Voltage measurements of a-Si:H thin film solar cell. Role: CoI, 1 year, MIT-KFUPM.
- Theoretical Modeling of electrical and mechanical properties of a-Si:H. Role: CoI, 1 year, MIT-KFUPM.
- Engagement ring: SERS tools for single molecule detection. Role: CoI, 2 years, MARSDN, New Zealand.
- Nanotechnologies for DNA sequencing, Role: CoI, 2 years, MI-VUW, New Zealand.
- Strong Photon-Molecule Coupling Fields. Role: CoI, 3 years, Japan.

Research Summary

- Number of Published Papers (110+)
- Citations (1506)
- H-Index (22)
- Number of Patents (11)
- Books and book chapter (1 and 5).

Award and Recognitions

- K.A.CARE research fellowship award, KSA
- Recognition of scientific patents, KFUPM
- Outstanding performance (A+), RI, KFUPM
- Best speaker award, ICNM2013 conf., India.
- Best student award, University of Tsukuba, Japan
- NIMS junior research awards, NIMS, Japan
- University distinction award, KUET, Bangladesh

Skills and Expertise

- Fabrication of nanostructured and functional thin films using PVD and drop-cast techniques. Hand-on and inexpensive synthesis techniques for various nanoparticles including noble metal nanoparticles bi-metal nanoparticles, semiconducting nanoparticles, magnetic nanoparticles etc.
- Well-experienced in Spectroscopic Ellipsometry, Sputtering coater, Flurolog3, X-ray diffraction (XRD), FTIR, TGA, µPCD, Keithley IV/CV, Profilometer, NSOM, Dark-field microscope, Confocal Raman spectrometer etc.
- Well-versed in digital system design including Active HDL, Nexys4, ELVIS II$^+$, FPGA, ISE Xilinx.
- Writing proposal, reports, work papers, briefings and other information material.