

CURRICULUM VITAE

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After earning my Bachelors (2003, PCM) from Kurukshetra University and Masters (2006, Physics) from Vikram University degrees I also received M.Tech (2009, Nanotechnology) degree from NIT Kurukshetra. I received my PhD degree (2015, Physics) from the Department of Physics, Indian Institute of Technology Delhi (IIT Delhi) under the supervision of Prof. [B. R. Mehta](#). I worked as a post-doctoral fellow at the Lawrence Berkeley National Laboratory, Berkeley, CA, United States and at the Inter-University Accelerator Centre (IUAC), New Delhi (2016 – 2019, Mentor: Dr. D. Kanjilal). Before joining the Dept. of Physics and Astrophysics, CUH in February, 2020 as an Assistant Professor, I taught for a brief period of time in the Department of Applied Physics, Delhi Technological University (DTU), Delhi. My research interests are:

- ❖ *Synthesis, characterization and applications of Graphene and other 2D materials;*
- ❖ *Fabrication and characterization of Schottky Barrier diodes, photovoltaic, gas sensing and biophysical devices;*
- ❖ *Use of advanced experimental techniques, such as, High-resolution Scanning probe and Electron microscopy, photoemission spectroscopy, charge transport measurements etc. for investigating the surfaces and interfaces properties of nanomaterials;*
- ❖ *Radiation (Swift heavy ion beam, Low energy ion beam and Gamma radiation) induced modifications and characterizations of nanomaterials based devices;*
- ❖ *Thin-film solar cells: especially, low-cost CZTS and CIGS based solar cells*

Ongoing Project: Study of the Properties of Graphene-Silicon Schottky Junction under Intense Radiation Environments (sponsored agency: UGC).

EDUCATION

Ph.D. in Physics

01/2010 – 05/2015

Indian Institute of Technology Delhi (IIT Delhi), New Delhi, INDIA

Thesis: Hydrogen Sensing and Photovoltaic Properties of CVD Grown Graphene and Graphene Composite Layer

Supervisor: Prof. B. R. Mehta, Department of Physics, IIT Delhi

M. Tech. in Nanotechnology (CGPA: 8.6/10) 07/2007 — 07/2009

National Institute of Technology (NIT), Kurukshetra, Haryana, INDIA

Thesis: Fabrication and characterization of copper and copper-oxide nanowires

M. Sc. in Physics (Percentage: 64.42) 06/2004 — 06/2006

Vikram University, Ujjain, M.P. INDIA

AWARDS AND ACHIEVEMENTS

1. Recipient of **UGC-Dr. D. S. Kothari Postdoctoral Fellowship (DSKPDF)**, Award No. F.4-2/2006 (BSR)/PH/15-16/0063;
2. Recipient of **Bhaskara Advanced Solar Energy (BASE) Fellowship (2014)**, Award No. BASE-I/7;
3. Recipient of **Senior Research Fellowship (SRF)**: From Jan 2010 to December 2014, for pursuing Ph.D. at IIT Delhi;
4. Recipient of **GATE Fellowship**: From July 2007 to July 2009, for pursuing M.Tech. at NIT Kurukshetra;
5. Qualified NET/SLET and GATE (2007).
6. Nature INDIA published special research highlight for one of our articles titled "Antireflection properties of graphene layers on planar and textured silicon surfaces".
<http://www.nature.com/nINDIA/2013/130509/full/nINDIA.2013.62.html>;
7. Nanotechnology online (Nanotechweb.org) special research highlight titled "Antireflection properties of graphene layers on planar and textured silicon surfaces",
<http://nanotechweb.org/cws/article/lab/53111>;

SELECTED PUBLICATIONS

(a) Publications in International Journals:-

1. **Rakesh Kumar** and B.R. Mehta, A parametric study on the influence of synthesis conditions on the quality of graphene growth, **J. Nanosci. Nanotechnol.**, Vol. 17 (2017), 286–299. (Impact Factor: 1.483).
2. **Rakesh Kumar**, Deepak Varandani and B. R. Mehta, Reversible activated transport to hopping conduction transition in graphene layers; molecular adsorption induced defect states, **J. Electrochem. Soc.**, Vol. 163 (2016), B539-B542. (Impact Factor: 3.662).
3. **Rakesh Kumar**, Deepak Varandani and B. R. Mehta, Nanoscale interface formation and charge transfer in Graphene/Silicon Schottky junctions; KPFM and CAFM studies, **Carbon**, Vol. 98 (2016), 41-49. (Impact Factor: 7.466).

4. **Rakesh Kumar**, Shweta Malik and B.R. Mehta, Interface induced hydrogen sensing in Pd nanoparticle/graphene composite layers, **Sensors and Actuators B**, Vol. 209 (2015) 919–926. (Impact Factor: 6.4).
5. **Rakesh Kumar**, B. R. Mehta, Mehar Bhatnagar, S. Ravi, S. Mahapatra, S. Salkalachen and Pratha Jhawar, Graphene as a transparent conducting and surface field layer in planar Si solar cells, **Nanoscale Research Letters**, Vol. 9 (2014), 349. (Impact Factor: 3.125).
6. **Rakesh Kumar**, A. K. Sharma, Mehar Bhatnagar, B. R. Mehta and Shyama Rath, Antireflection properties of graphene layers on planar and textured silicon surfaces, **Nanotechnology**, Vol. 24 (2013), 165402. (Impact Factor: 3.404).
7. Saurabh K. Sengar, B. R. Mehta, **Rakesh Kumar** and Vinod Punia, In-flight gas phase growth of metal/multilayer graphene core shell nanoparticles with controllable sizes, **Scientific reports**, Vol. 3 (2013): 2814. (Impact Factor: 4.259).
8. **Rakesh Kumar**, Deepak Varandani, B. R. Mehta, V. N. Singh, Zhenhai Wen, Xinliang, Feng and Klaus Mullen, Fast response and recovery of hydrogen sensing in Pd–Pt nanoparticle–graphene composite layers, **Nanotechnology**, Vol. 22 (2011), 275719. (Impact Factor: 3.404).
9. **Rakesh Kumar**, B. R. Mehta, Deepak Varandani, and V. N. Singh, Resistive Switching in Copper Oxide Nanorods: A Bottom Up Approach Applicable for Enhanced Scalability, **J. Nanosci. Nanotechnol.**, Vol. 11 (2011), 8538–8542. (Impact Factor: 1.483).

(b) Publications in National Symposium and Conferences:-

1. **Rakesh Kumar**, B. R. Mehta and D. Kanjilal. Use of Kelvin Probe Force Microscopy for Identification of CVD Grown Graphene Flakes on Copper Foil, **AIP Conference Proceedings** 1832, 050019 (2017).

CONFERENCES, WORKSHOPS AND MEETINGS

1. Participated and presented work in the form of **Oral** presentation in the “**International Conference of Young Researchers in Advanced Materials (IUMRS-ICYRAM 2016)**” held at Indian Institute of Science (IISc), Bangalore on 11th Dec.- 15th Dec.-2016.
2. Participated and presented work in the form of **Poster** presentation in the “**INDIA INTERNATIONAL SCIENCE FESTIVAL (IISF)**” from 7-11 December, 2016 at NPL New Delhi; organized by Ministry of Science and Technology & Earth Sciences, CSIR, Govt. of India and Vigyan Bharti, India.
3. Participated and presented work in the form of **Poster** presentation in International conference on “**Ion Beams in Materials Engineering and Characterization (IBMEC-2016)**” held at Inter-University Accelerator Centre (IUAC), Delhi on 28th Sep.- 1st Oct.-2016.
4. Attended in International school on “**Ion Beams in Materials Science (IBMS-2016)**” held at Inter-University Accelerator Centre (IUAC), Delhi on 22nd Sep.- 27th Sep.-2016.
5. Participated in **INDIA INTERNATIONAL SCIENCE FESTIVAL (IISF)** from 4-8 December, 2015 at IIT Delhi; organized by Ministry of Science and

Technology & Earth Sciences, Govt. of India, Vigyan Bharti and TIFAC, New Delhi.

6. Participated and presented work in the form of **Oral** presentation in “**International conference on Materials for Advanced Technologies (ICMAT)**” held in Singapore on 28th Jun. - 3rd Jul.-2015.
7. Participated and presented work in the form of **Poster** presentation in International conference of **Material Research Society (MRS)**, held in Boston, USA, on 1st Dec. – 6th Dec. 2013.
8. Participated and presented work in the form of **Poster** presentation in “**International Conference on Nano Science and Technology (ICONSAT 2014)**” held at Panjab University Chandigarh and organized by INST Mohali on 2nd March – 5th March, 2014.
9. Organized National Review and Coordination Meeting of NANO Mission Council, IIT Delhi, New Delhi, India, February, **2011**.
10. Organized and Participated EU-INDIA Workshop and EICOON School on Nanomaterials for Sustainable Energy, India Habitat Centre, New Delhi, India, November, **2010**.

PROFESSIONAL SERVICE

Referee for Nanotechnology, Semiconductor Science and Technology, Journal of Physics D: Applied Physics, Surface and Coatings Technology.

EXTRA-CURRICULAR ACTIVITIES

1. Life member, Material Research Society of India, INDIA
2. Life member, Indian Carbon Society, INDIA
3. Life member, Material Research Society (MRS), USA and Material Research Society, Singapore;