

Ashwani Kumar

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Academic Background

| Degree | University/ Institute | Subjects | Year of passing | CGPA/ Percentage |
|--------|---|---|--------------------|---------------------|
| Ph.D | Indian Institute of Technology Mandi, India | Inorganic-organic hybrids/Polyoxometalates/ Ionic liquids/Photochromism/Catalysis | 2019 | 7.75/10 |
| M.Sc | Himachal Pradesh University, Shimla, H.P., India | Organic Chemistry | 2012 | 71.25 |
| B. Ed. | Govt. College of Teacher Education, Dharmshala, H.P., India | Teaching of Physical Sciences | 2010 | 65.27 |
| B.Sc | Govt. Degree College, Kullu, H.P., India | Chemistry, Physics and Mathematics | 2009 | 68.14 |

Academic Achievements

- ❖ Qualified JRF exam 2013, June - U. G. C, Govt. of India.
- ❖ Qualified JRF exam 2013, Dec. - U. G. C, Govt. of India.
- ❖ Qualified State Eligibility Test (SET), 2014 – State govt. of Himachal Pradesh, India.
- ❖ “University Grant Commission” New Delhi, fellowship Awarded in 2014 Feb., India for Ph.D.
- ❖ Junior Research Fellow at IIT Mandi from Feb 2014 to Feb 2016.
- ❖ Senior Research Fellow at IIT Mandi from Feb 2016 to Oct 2018.
- ❖ Teaching assistant of several B. Tech. and MSc. level courses during PhD tenure and awarded with best teaching award.
 - (a) In Feb. may 2016 for *Interactive Socio-Technical Practicum (ISTP)* combined programme of *Worcester Polytechnic Institute (WPI) USA* and *IIT Mandi, India*.
 - (b) In Feb. 2017 for excellent assistance in teaching during B. Tech. course IC-130.
- ❖ One year diploma in computer “A-grade” in 2009.

Area of Research Interests

- ❖ *Inorganic Chemistry*
 - ❖ *Polyoxometalates/ Metal Clusters*
 - ❖ *Organic Inorganic Hybrids*
 - ❖ *Photochromism, photocurrent devices, optoelectronic and molecular switches*
 - ❖ *Synthesis*
 - ❖ *Catalysis and Photocatalysis*
 - ❖ *Biodiesel and Plasticizer*
 - ❖ *Metal Organic Frameworks (MOFs)*

Workshop and Conference Attended

In India:

- ❖ A talk on multifunctional material based on Polyoxometalates in “Functional Materials and Simulation Techniques (ICFMST-2019)” during **7-8 June, 2019** at Chandigarh University.
- ❖ A poster presentation entitled “Engineering Multi-functionality in Hybrid Polyoxometalates: Aromatic Sulfonium Octamolybdates as Excellent Photochromic Materials and Self-Separating Catalysts for Epoxidation” in *MTIC-XVII-PUNE*, during **11-14th Dec, 2017** at *NCL-IISER-PU, Pune, Maharashtra, India*.
- ❖ A poster presentation entitled “*Role of Polyoxometalate in photochromism and photocatalysis*” Conference on Spectroscopy of Emerging Functional Materials (SEFM-2017) during **9-10th Oct, 2017** at IIT Mandi.
- ❖ A poster presentation entitled “Aromatic Sulfonium Polyoxomolybdates: A New Class of Solid State Photochromic Materials with Tunable Properties” Thematic conferences in Chemical Sciences (*TC2S-2017: Sustainable Chemistry*) during **15-16th May, 2017** at *IIT Ropar, India*. Thematic conferences in Chemical Sciences (*TC2S-2017: Sustainable Chemistry*) during **15-16th May, 2017** at *IIT Ropar, India*.
- ❖ A poster presentation entitled “Aromatic Sulfonium Octamolybdates: Photochromism and Catalysis” 21st National CRSI symposium in Chemistry (*CRSI-21st*) during **14-16th July, 2017** at Indian Institute of Chemical Toxicology, *IICT Hyderabad, India*.
- ❖ Attended Indo-UK workshop on “Advanced nanomaterial for energy, health and sustainability during **3-6th Oct, 2016** in *IIT Mandi*.
- ❖ Participated in “National Symposium on Advanced Materials” during **27-28th May, 2014** conducted by *Indian Institute of Technology Mandi (H.P)*.

In abroad:

- ❖ A poster presentation and participated in “27th Photo IUPAC Dublin 2018, International Symposium on Photochemistry” during **8-13th July, 2018** at University College Dublin, Dublin, Ireland.

Knowledge of Software

- ❖ Single Crystal X-ray structure solution and refinement using SHELXS-97, SIR 92/97, SHELXL-97, SHELXTL program packages, Olex².
- ❖ Experience in using several scientific programs (Chem Draw, Origin software for spread sheet, Powder X software for XRD).
- ❖ Hyperchem software for theoretical studies.
- ❖ Data analysis software for analysis of HRMS data.

Professional Skills and Experiences

- ❖ Gas Chromatography (GC) Agilent 7890A series with open lab control panel software A.01.05 (1.3.19.115).
- ❖ HPLC (Shimadzu)
- ❖ UV-Visible (Shimadzu UV-2450) spectrophotometer
- ❖ Fluorescence (Perkin-Elmer) spectrophotometer
- ❖ Fluorescence lifetimes Horiba scientific Delta Flex TCSPC system

- ❖ Cyclic Voltammeter (Metrohm Autolab instrument)
- ❖ FT-IR (Agilent Cary-660 with Diamond ATR and PerkinElmer Serial No:88689) spectrophotometer
- ❖ SEM & EDAX (Hitachi S4300 SEIN, Japan)
- ❖ Single crystal X-Ray diffractometer (Agilent SuperNova diffractometer)
- ❖ X-Ray powder diffractometer (Bruker SMART D8 Series).
- ❖ Rich in experience of growing single crystals suitable for X-ray diffraction and analysis.
- ❖ TGA and DSC analyzer
- ❖ NMR
- ❖ ESI-TOF HRMS Spectrometer (Bruker Maxis Impact instrument).
- ❖ Dip Coater, Spin coater, Solar simulator, UV pulse measurement, AAS, Dynamic light scattering (DLS).

Research Experience

- ❖ **Senior Research Fellow (SRF), Feb 1st 2016 to 31st Oct 2018**
Indian Institute of Technology Mandi, Mandi, Himachal Pradesh, India 175001.
- ❖ **Junior Research Fellow (JRF Feb 5th 2016 to January 31st 2016**
Indian Institute of Technology Mandi, Mandi, Himachal Pradesh, India 175001.

Position of responsibilities

- ❖ Volunteer for organizing **Indo-UK workshop** on “Advanced nanomaterial for energy, health and sustainability” during **3-6th Oct, 2016** at IIT Mandi.
- ❖ Guided several UG/PG and summer research project students as a co-instructor.
- ❖ Guided several groups of *WPI (USA)* and *IIT Mandi* students during their various innovative projects.

Project and training

- ❖ Training on GC, HRMS, SCXRD, PXRD, FESEM and BET at *IIT Mandi*.
- ❖ Project on “Organic-inorganic hybrid materials for photochromic, photocatalytic and antioxidant activities” granted by Science and Engineering Research Board (SERB), Act 2008, Department of Science and Tech., govt. of India. It includes total grant of RS. 40 lakhs and one man power in Aug. 2017 to Aug. 2020.

Teaching Experience

1. Teaching experience of 3.5 years at GDC Ani at Haripur.
2. Teaching experience of 1.5 years at GC Kullu till date Feb. 2024

Publications

2023

- ❖ Synthesis of Metal Organic Frameworks (MOFs) and Their Derived Materials for Energy Storage Applications

S Dutt, **A Kumar**, S Singh *Clean Technologies* **5** (1), 140-166

- ❖ Use of 3D printed techniques for organic pollutants removal
A Kumar, S Dutt, R Kumar
Book: 3D Printing Technology for Water Treatment Applications
Pages: 193-211
Publisher: Elsevier

2019

- ❖ Nanomaterials of metal and metal oxides for optical biosensing application
S Dutt, AK Gupta, KR Aadil, N Bunekar, VK Mishra, R Kumar, **A Kumar** et al.
Publication date 2022/1/1.
Book: Metal Oxides for Biomedical and Biosensor Applications
Pages: 321-352
Publisher: Elsevier

2018

- ❖ Facile synthesis of an organic solid state near-infrared-emitter with large Stokes shift via excited-state intramolecular proton transfer
AK Gupta, **A Kumar**, R Singh, M Devi, A Dhir, CP Pradeep *ACS omega* **3** (10), 14341-14348.
- ❖ Aromatic sulfonium polyoxomolybdates: tuning the photochromic properties through substitutions on the counter ion moiety
A Kumar, CP Pradeep *CrystEngComm* **20** (19), 2733-2740.

2017

- ❖ **Kumar, A.**; Gupta, A. K.; Devi, M.; Gonsalves, K. E.; Pradeep C. P. *Inorg. Chem.*, **2017**, 56 (17), pp 10325–10336. “*Engineering Multifunctionality in Hybrid Polyoxometalates: Aromatic Sulfonium Octamolybdates as Excellent Photochromic Materials and Self-Separating Catalysts for Epoxidation*”
Journal: Inorganic Chemistry

2015

- ❖ **Kumar, A.**; Devi, M.; Mamidi, N.; Gonsalves, K. E.; Pradeep C. P. *Chem. Eur. J.*, **2015**, 21, 18557-18562. “*Aromatic Sulfonium Polyoxomolybdates: Solid-State Photochromic Materials with Tunable Properties*”
Journal: Chemistry-A European Journal
- ❖ Kalyani, V.; Satyanarayana, VSV.; Sarkar, A. S.; **Kumar, A.**; Pal, S. K.; Ghosh, S.; Gonsalves, K. E.; Pradeep C. P. *RSC Adv.*, **2015**, 5, 36727-36731. *Eur. J. Org. Chem.*, 2015, 2015, 122. “*A radiation sensitive hybrid polymer based on an Mn-Anderson polyoxometalate cluster and a UV active organic monomer: synergistic effects lead to improved photocurrent in a photoresponse device*”
Journal: RSC Advances