

## Report of Research carried out under RUSA 2.0

An amount of Rs. 4,50,000/- was sanctioned as financial assistance for strengthening research under RUSA 2.0.

1. An amount of Rs. 50,000/- was allotted under the minor head, "Hiring of Services". The allotted amount was spent for recording Single Crystal X-ray Diffraction (SCXRD), Powder X-ray Diffraction (PXRD), Scanning Electron Micrographs (SEM) and Transmission Electron Micrographs (TEM) of compounds synthesised in our laboratory. These services were hired from Government Institutions namely IITs and Sophisticated Analytical Instrumental Facility (SAIF), Panjab University Chandigarh.
2. An amount of Rs. 40,000/- was sanctioned under the minor head, "Equipment Repair or Accessory to the existing Equipment. This amount was spent to purchase "Glassy Carbon Electrode" which is an Accessory of existing equipment, "Cyclic Voltmeter".
3. An amount of Rs. 50,000/- was sanctioned under the minor head, "Purchase of Minor Equipment". This amount was spent to purchase, "Desiccators and Magnetic Stirrers". These minor equipments are used in the research laboratory on daily basis as logistic equipments.
4. An amount of Rs. 3,10,000/- was sanctioned under the minor head, "Consumables / Chemicals / Glassware etc. This amount was spent to buy ultra-pure chemicals /solvents required for research purpose.

The combined impact of expenditure under above mentioned four minor heads was substantial improvisation in designing the experiments in our research laboratory. The strengthening of research facilities led to publication of quality research in Journals of International repute having high impact factor and *h*-index.

### **Following list of publications is outcome of Seed Grant / Strengthening Research Grant under the Budget head P03 Expenditure on Capital Account, R11 Research and Innovation under RUSA 2.0**

1. Synthesis of eight isostructural 2D Lanthanide Coordination Polymers assembled by rigid Furan-2,5-dicarboxylic acid and flexible Adipic acid as linkers and exploration of luminescent Eu/Tb Polymers as efficient and sensitive sensors for Nitroaromatic Compounds  
Zaib ul Nisa, Lobzang Tashi, Charanjeet Sen, Nargis Akhter Ashashi, Subash Chandra Sahoo and **Haq Nawaz Sheikh**  
*New J. Chem.*, **44**, 8125 - 8137, **2020**.
2. Coordination Polymers of Manganese(II), Cobalt(II), Nickel(II) and Cadmium(II) decorated with rigid Pyrazine-2,3-dicarboxylic acid linker: Synthesis, Structural diversity, DFT study and Magneto-luminescence Properties  
Charanjeet Sen, Manesh Kumar, Zaib ul Nisa, Nargis Akhter Ashashi, Antonio Frontera, Subash Chandra Sahoo and **Haq Nawaz Sheikh**  
*Polyhedron*, **187C**, 114629, **2020**.
3. Lanthanide Contraction in Action: Structural Variations in Thirteen Lanthanide(III)-Thiophene-2,5-dicarboxylate Coordination Polymers (Ln = La-Lu, except Pm and Tm) Featuring Magnetocaloric Effect, Slow Magnetic Relaxation and Luminescence Lifetime-based Thermometry  
Manesh Kumar, Le-Qian Li, Jan K. Zaręba, Lobzang Tashi, Subash Chandra Sahoo, Marcin

- Nyk, Sui-Jun Liu and **Haq Nawaz Sheikh**  
*Cryst. Growth & Design*, **20**, 6430-6452, **2020**.
4. Down converting serine-functionalised NaYF<sub>4</sub>:Ce<sup>3+</sup>/Gd<sup>3+</sup>/Eu<sup>3+</sup> @NaGdF<sub>4</sub>:Tb<sup>3+</sup> photoluminescent probe for chemical sensing of explosive nitroaromatic compounds  
Lobzang Tashi, Richa Singhaal, Manesh Kumar and **Haq Nawaz Sheikh**  
*New J. Chem.*, **44**, 19908-19923, **2020**.
  5. Citric acid assisted terbium doped cerium molybdate nanoparticles as photoluminescent probe for selective and sensitive detection of Pb<sup>2+</sup> ion in aqueous solution  
Swaita Devi, Richa Singhaal, Lobzang Tashi, **Haq Nawaz Sheikh**  
*J. Mater. Sci. - Mater. Electron.*, **32**, 26821- 26837, **2021**.
  6. Asparagine Modified Downconversion NaGdF<sub>4</sub>:Dy<sup>3+</sup>/Tb<sup>3+</sup> Nanophosphor for Selective and Sensitive Detection of Cu (II) Ion  
Lobzang Tashi, Richa Singhaal, Zaib ul Nisa, Swaita Devi, **Haq Nawaz Sheikh**  
*New J. Chem.*, **45**, 15392 – 15404, **2021**.
  7. Solvothermal Self Assembly of Three Lanthanide(III)-Succinates: Crystal Structure, Topological Analysis and DFT calculations on Water Channel  
Nargis Akhter Ashashi, Manesh Kumar, Zaib ul Nisa, Antonio Frontera, Subash Chandra Sahoo and **Haq Nawaz Sheikh**  
*J. Mol. Str.*, **1245**, 131094, **2021**
  8. PEI Functionalized NaCeF<sub>4</sub>:Tb<sup>3+</sup>/Eu<sup>3+</sup> For Photoluminescence Sensing of Heavy Metal Ions and Explosive Aromatic Nitro Compounds  
Richa Singhaal, Lobzang Tashi, Zaib ul Nisa, Nargis Akhter Ashashi, Charanjeet Sen, Swaita Devi, **Haq Nawaz Sheikh**  
*RSC Advances*, 11, 19333-19350, **2021**.
  9. Hybrid photoluminescent material of lanthanide fluoride and graphene oxide with stronger luminescence intensity as chemical sensor of mercury ion  
Richa Singhaal, Lobzang Tashi, Swaita Devi, **Haq Nawaz Sheikh**  
*New J. Chem.*, **46**, 6528-6538, **2022**.
  10. Solvothermal synthesis and crystal structures of two Holmium(III)-5-Hydroxyisophthalate entangled coordination polymers and theoretical studies on the importance of π···π stacking interactions  
Nargis Akhter Ashashi, Manesh Kumar, Rosa M. Gomila, Antonio Frontera, **Haq Nawaz Sheikh**, Subash Chandra Sahoo  
*J. Mol. Str.*, **1254**, 132329, **2022**.

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**Amount Sanctioned = Rs. 4,50,000/-**

**Vide No. RUSAJU/2/2019-20/111/3588-3636 Dated 14-11-2019**