

Indian Science Technology and Engineering facilities Map (I-STEM)

Invites application for

1. Partial financial support for using R&D facilities in other institutions through the I-STEM web portal to Users from Academic Institutions and Start-ups (Format-1)

Format for requesting support for accessing and using facilities through the I-STEM web portal.

(i) Details of the Personal Information

- a. Name of the Researcher/Faculty Member: **Dr. Suman Samai**
- b. Name of the Institution/Start-up: **Prabhat Kumar College Contai**
- c. Name of the Department: **Chemistry**
- d. Degree registered for/Product being developed (for start-up)
- e. Mob. No. **7872585251** f. Email ID: **suman2iit@gmail.com**

(ii) Project/Research topic Details:

- Project Title/Research Title: **“Design, synthesis and applications of self-assembled functional soft materials: organogel/hydrogel/metallogel.”**
- Sub area: **Organic Chemistry/ Material science**
- Area Description: Small molecule supramolecular self-assembly plays a crucial role in smart functional materials. The smart materials can be used in various practical ways.
- Aims & Objective (in Bullets):
 - To design and synthesize small molecular smart materials.
 - To synthesize gel materials which are external stimuli responsive.
 - What are the weak force of interactions responsible for supramolecular self-assembly.
 - To demonstrate the possible applications in sensors and drug delivery system.
- Duration (MM/YYYY):06/2022-05/2025
- Project Summary (1000 words): Separate sheet added.
(Separate page may be attached to justify the requirements)
- **Technical Details**
 - a. TRL
 - b. Methodology
 - c. Design & development
Imidazole/pyridine containing ligands will be synthesized and their self-assembled nature will be studied in different solvents as well as in water. The supramolecular nature will be studied through different instrumental techniques such as IR, NMR, UV-Vis, powder X-ray/ single crystal x-ray. Most importantly the mechanical property of the expected materials would be examined through rheology. Moreover the gels would be examined for its possible applications as dye absorbing agents, sensor, and membrane, matrix for cell culture and as drug delivery agents.
 - d. Facilities and Instrumentation required
 - i) Infrared spectroscopy (IR), ii) Nuclear magnetic resonance spectroscopy (NMR, ^1H , ^{13}C)
 - iii) Ultraviolet–visible spectroscopy, iii) X-ray powder diffraction (XRD), iv) Single-crystal X-ray Diffraction, V) Rheology.

e. Consumables (Scientific materials): Mentioned in separate sheet

• **Expected output and outcome**

- The newly design imidazole/pyridine based gelator can easily be synthesized from readily available literature.
- New gelator would provide a facile and easy way of gelation.
- The organogel/hydrogel/metallogel can be used as waste water treatment.
- The materials may show exceptional mechanical behaviour.
- The materials might be used as sensor for different metals
- It can be used a matrix for cell culture
- The new self-assembled materials may show excellent external stimuli responsiveness.
- The materials can be used as drug delivery agents.

• **Industry/Institute Collaboration**If, yes

- (i) Name of the Collaborating Industry/Institute
- (ii) Collaboration Details
- (iii) Additional Details if any

• **Funding required from I-STEM (with justification:**

Details of Requirements & Mode of the Engagement: (Attach the quotation for the consumables)

(i) Short term Engagement:

- a. Usage of testing/characterization facilities across the country (Characterization Mode)
 - i. Testing Charges
 - ii. Consumable charges
 - iii. Travel Cost (Boarding and Lodging, if any)
- b. Usage of fabrication and testing facilities across the country (Fabrication Mode)
 - i. Fabrication and testing Charges
 - ii. Consumable charges (if any)
 - iii. Travel Cost (Boarding and Lodging, if any)

(ii) Medium term Engagement:

- a. Execution of project in any one of the Host Institution (Project Mode)
 - a. Fabrication and or testing Charges
 - b. Consumable charges (if any)
 - c. Travel Cost (Boarding and Lodging, if any)
- b. Execution of project in Multi Host Institutions (Project Mode)
 - a. Fabrication and or testing Charges
 - b. Consumable charges (if any)
 - c. Travel Cost (Boarding and Lodging, if any)

(Round-trip to the Host Institution by 2nd class (Non-AC) railway via the nearest route)

Details of User's Bank Account:

(Please send a copy of the cancelled cheque/copy of the passbook carrying all the information needed)

Beneficiary Name (User's name)

SUMAN SAMAI

PAN: EBEP56154Q

Bank Account No. 30074712714

Name of the Branch: MAHISHADAL

IFSC Code: SBIN0001298

Note: Proposed proposal must be executed within stipulated duration (max. 6 month) to avoid fund availability issues. Travel form will be provided by the I-STEM office. The users will submit the technical report, original invoice (duly signed by the Head of the Institution) raised by the Host Institution through I-STEM portal only along with a copy of the travel forms and original tickets through post to the Nodal Officer, I-STEM, Indian Institute of Science, Bangalore. A scan copy of all the documents may be sent in advance.



Dr. Suman Samai

Assistant Professor

Department of Chemistry

Prabhat Kumar College Contai, West Bengal