

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

Cryo High Resolution Transmission Electron Microscope Central Facility (Cryo-HRTEM)

Analysis Request Form (Internal & External users)

Applicant Details

User belongs to: IIT Bombay University National Lab Industry

User name:

Institute/University/Organization:

Email ID: Mobile No.:

Name of Guide/PI:

Guide/PI Email ID: Guide/PI Mobile No.:

Address of Institute/Organization:

Sample information:

Number of samples	
Sample Identification code	
Sample type	Biological/Polymer/Metal/Thin film/Ceramic or Composite material/ Nano particles or Nano materials/Other.....
Detailed description of all samples	
Expected Morphology	
Expected Particle Size	
Biological sample preparation requirement <small>(Refer Annexure II before filling)</small>	1. Staining (Positive/Negative) <input type="checkbox"/> 2. Embedding and Sectioning <input type="checkbox"/> 3. Freeze fracture <input type="checkbox"/> 4. Cryo Plunging <input type="checkbox"/>
Medium of dispersion for powder sample <small>(Refer Annexure II before filling)</small>	Ethanol <input type="checkbox"/> Methanol <input type="checkbox"/> Water <input type="checkbox"/> Isopropyl alcohol <input type="checkbox"/> Acetone <input type="checkbox"/> Toluene <input type="checkbox"/> Non of the above <input type="checkbox"/> IF none of the above, please mention the medium for dispersion and send it along with the samples. Ultra-sonication time for Dispersion of powder sample in above mentioned solvent :


Type of analysis (Kindly tick):

TEM/HR Imaging & Diffraction	CRYO Imaging	STEM Imaging	EDS analysis (spectrum+ Image)	Line Scan analysis	Mapping analysis

For EDS analysis, kindly mention the elements to be analyzed.

Material safety data:

If you are submitting more than one sample which are different in nature/composition, submit separate MSDS

Sample Properties	Carcinogenic* (level) <input type="checkbox"/> Toxic <input type="checkbox"/> Radioactive <input type="checkbox"/> Corrosive <input type="checkbox"/> Explosive <input type="checkbox"/> Flammable <input type="checkbox"/> Other (specify): _____ * Carcinogenic level as per IARC grouping.
Moisture	Present <input type="checkbox"/> Absent <input type="checkbox"/> NA <input type="checkbox"/>
Volatile organic compound	Present <input type="checkbox"/> Absent <input type="checkbox"/> NA <input type="checkbox"/>
Stability of sample	Room temp. <input type="checkbox"/> Hygroscopic <input type="checkbox"/> Sublimes <input type="checkbox"/> Reactive in: Air <input type="checkbox"/> Light <input type="checkbox"/> Heat <input type="checkbox"/> Vacuum <input type="checkbox"/> Moisture <input type="checkbox"/> May decompose when exposed to accelerated electron beam <input type="checkbox"/>
Mention the storage and handling conditions if anything specific	
Is Refrigeration is needed	Yes <input type="checkbox"/> No <input type="checkbox"/> If Yes, Specify Temperature: 2°- 4° or Below 0°
Whether incompatible with any material	Yes <input type="checkbox"/> No <input type="checkbox"/> (Specify the materials):
Health hazards	Yes <input type="checkbox"/> No <input type="checkbox"/> (Irritant to skin/irritant to eyes/harmful to skin/ toxic if inhaled/toxic if ingested)
First aid measures	Eye/Skin/Inhalation/ Ingestion/Others (specify):
Disposal Method of sample	
Please fill appropriate numbers in the NFPA diamond: (*reference image attached below)	
Additional information if any:	

Note: All Samples will be discarded after 15 days of analysis. If you wish to collect the Samples then you are required to make arrangement for the same.

Declaration

I confirm that the samples submitted for analysis are for research purpose only and the above furnished details are correct and true to the best of my knowledge. I understand that I will be held responsible for any damages arising from incorrect information provided by me against material safety data.

I agree to acknowledge Cryo High Resolution Transmission Electron Microscope facility at Department of Chemical Engineering, IIT Bombay for providing analytical facility for my research work, in my publications. I also agree to send the publication reference (Journal name/volume number/names of the authors/date of issue of the publication etc.) to cryohrtem@iitb.ac.in

I declare that the “Content of this report is meant for our information only and we will not use the content of this report for advertisement, evidence, litigation or quote as certificate to third party” I accept that all the issued reports/results (Soft/hard) will not carry any Signature or Seal and Stamp of SAIF/CRNTS IIT Bombay.

Signature of the User

Signature of the In Charge/HOD/PI with College/P.I.
Guide seal / stamp

Date:

Place:

* Reference image for filling NFPA diamond:



IMPORTANT NOTE:

- a. Potentially hazardous/toxic/radioactive samples may not be accepted for analysis.
- b. Requisition letter and proof of payment / DD of required amount should be send by post or submitted in person to **Incharge, Cryo-HRTEM Lab, Room number: 102 A, Chemical Engineering Department, IIT Bombay, Powai, Mumbai-400076.**
- c. The Demand Draft should be in favor of "**The Registrar, IIT Bombay**"
- d. Your appointment will be as per the queue, once we receive the Requisition letter, duly filled form and advance payment. Partially filled form will not be registered.
- e. We prefer that you/ your representative, who know/understands the sample/material and what is expected to be seen, will be present on the day of appointment. If the user is not present representative data will be taken for the samples.
- f. **Attach reference images for the sample (if any) with the form.**
- g. **Internal samples (IITB) will be accepted 2 at a time.**

Annexure I

For filling detailed description of the sample: kindly refer to the below sub categories and Examples.**If your sample details do not match with the below list, please give the correct Sample type and sample description.**

Sample type	Description
Biological	Cells (Give type), Tooth, Gels, Scaffolds, Bone, Biofilm, Tissue, Leaf/plant extracts, Insect/Insect parts, Lipids/Liposome's, Proteins, Blood cells, Bacteria , Viruses, Sludge, Fibrin gel, etc.
Polymer	Resin, Alginate, Polystyrene, Polypropylene, PDMS, PVC, Polymeric microspheres, Fibers, Thermoplastic polyurethanes, Polymeric scaffold
Metal	Alloy, Chips, Micro tools, Fractography
Geological	Soil, Fly ash, Sand, Activated carbon, Cement
Nonmaterial's	CNT, Nano particles, Ferrite, Lamella
Thin film	Specify the material: Substrate: Glass/ Copper/Conducting material/Silicon wafer
Ceramic or Composite material	Detailed description of the sample/composite material

Example of Sample Description:

Sample type	Description
Biological	Shrimp waste extract
Biological and Nanomaterials	Au/Ag nano particles prepared from plant extract
Biological	Cells, blood cells or animal cells or E.coli/ Staph,Liposomes
Polymer	polystyrene nanoparticles
Thinfilm	Material: ZnO/TiO2/CZTS substrate: glass
Nanomaterials	Gold nano particles or CNT or
Composite material	CNT in polymer, CNT/ carbon and graphene

Annexure II

Sample preparation instructions for TEM (Room Temperature Mode and Cryo Mode):

- I. **Powder sample** will be dispersed in the solvent and after ultrasonication, it will be loaded/drop casted on the TEM grid. The grid will be dried under IR lamp. The representative TEM Images will be taken for that sample. **Medium for Dispersion** Ethanol /Methanol / Water /Iso-propyl alcohol. Any other medium should be provided by the user. Dispersion will be done by ultrasonication.
- II. In case of **bulk sample**, the sample dimension should be 3.0mm diameter circular disc with a thinned Electron transparent central area or **TEM** lamellas are prepared with the **FIB-SEM** if the area of interest needs to be precisely selected with an SEM and should be prepared at the user end. (Ion Milling, polishing etc.)
- III. Sample preparation for **biological samples** Ultramicrotomy, freeze fracturing, High Pressure freezing, sample fixation for biological samples, staining of samples (Charges are different for all sample preparation techniques.)

Brief description for various Biological sample preparation techniques:

- IV. **Staining:** - Positive staining, Negative Staining, Fume hood staining.
- V. **Cryo-Plunger:-**Samples are cooled so rapidly that the surrounding water molecules do not have time to crystallize.
- VI. **Freeze facture:-**Breaking a frozen specimen to reveal internal structures. Samples to be imaged in a SEM (block-face) or TEM (replica).
- VII. **High Pressure Freezer:** Cryo-immobilize your aqueous samples under high pressure with a unique freezing principle. Alcohol free freezing allow a superior cryo-fixation of the specimen enabling better quality results
- VIII. **Ultra-microtome:-**Preparation of semi- and ultra-thin sections as well as perfect, smooth surfaces of biological and industrial samples (tissue sample, polymer, rubber)for TEM, SEM, AFM and LM examination (Cryo and Room Temp. mode).Ultramicrotomes provide extremely thin sections and perfect surface quality in a wide range of applications. From materials science to cancer research.

For any further query, kindly contact on

Email: cryohrtem@iitb.ac.in

Contact: 022-2159-6166