

# INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

Sophisticated Analytical Instrument Facility (SAIF)

## Field Emission Gun Scanning Electron Microscope (FEG SEM)

### Analysis Request Form

#### Applicant Details

User belongs to:  IIT Bombay  University  National Lab  Industry

User name: .....

Institute/University/Organisation: .....

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 code	
Sample type	Biological / Composite Material / Thin Film / Crystalline Solid / Metal/Polymer/Ceramic/Composite/ Other (Please specify): ..... *biological samples should be submitted after primary fixation
Detailed description of the sample (Refer Annexure I before filling)	
Sample form	Powder/Pellet/Suspension/On glass substrate/Film/Others..... If suspension, then medium of suspension.....
If sample is Pellet, thin film (Refer Annexure II before filling)	Mention sample dimensions.....
If sample is powder, Dispersion required (Refer Annexure II before filling)	Yes/No If Yes, Medium for dispersion.....
Nature of the sample	Non-Conducting / Conducting / Semi-Conductor
Sample is	Magnetic /Non Magnetic

#### Type of analysis (Kindly tick):

SEM Image only	SEM Image + EDS	SEM Image + WDS	Only EDS	Only WDS


**SEM Analysis requirement:**

SEM Image	Secondary Electron Image / Back Scattered Electron Image
Analysis requirement	Surface Imaging / Cross Section Imaging / Surface + Cross Section imaging (*Cross-section analysis of powder and suspension samples is not possible)
Sample to be mounted	Planar/Cross Section/ Powder directly loaded on sample holder/ Drop cast for liquid or suspension samples
Expected Morphology	Brief description of shape.....
Expected Particle Size	
If EDS is required	Point EDS /area EDS/EDS mapping/ line scan List of expected elements (for EDS): .....
If WDS is required	Only WDS / EDS + WDS (point scan)/WDS mapping/ WDS line scan List of expected elements (for WDS): .....

**Material safety data:**

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

<b>Sample Properties</b>	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): _____
<b>Moisture</b>	Present <input type="checkbox"/> Absent <input type="checkbox"/> NA <input type="checkbox"/>
<b>Volatile organic compound</b>	Present <input type="checkbox"/> Absent <input type="checkbox"/> NA <input type="checkbox"/>
<b>Stability of sample</b>	Stable under RTP <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"/>
<b>Mention the storage and handling conditions if anything specific</b>	
<b>Whether incompatible with any material-</b>	Yes <input type="checkbox"/> No <input type="checkbox"/> (Specify the materials): .....
<b>Health hazards</b>	Yes <input type="checkbox"/> No <input type="checkbox"/> (irritant to skin/irritant to eyes/harmful to skin/ toxic if inhaled/toxic if ingested)
<b>First aid measures</b>	Eye/Skin/Inhalation/ Ingestion/Others (specify): .....
<b>Disposal Method of sample</b>	

<p>Please fill appropriate numbers in the NFPA diamond: (*reference image attached below)</p>	
<p>Additional information if any</p>	

**\*Along with this form MSDS should be submitted if available.**

**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. SAIF office will not dispatch the same to users under any circumstances**

**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 DST and SAIF/CRNTS, IIT Bombay for providing (Instrument name) 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 office.saif@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.

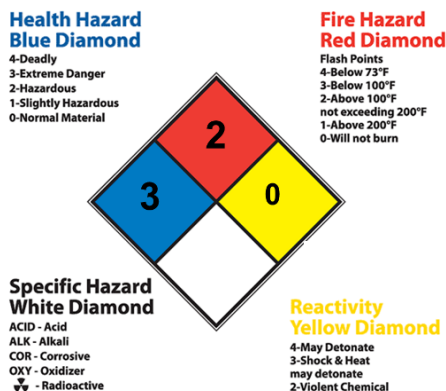
Signature of the User

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

Date:

Place:

**\* Reference image for filling NFPA diamond:**



**Health Hazard  
Blue Diamond**  
4-Deadly  
3-Extreme Danger  
2-Hazardous  
1-Slightly Hazardous  
0-Normal Material

**Fire Hazard  
Red Diamond**  
Flash Points  
4-Below 73°F  
3-Below 100°F  
2-Above 100°F  
not exceeding 200°F  
1-Above 200°F  
0-Will not burn

**Specific Hazard  
White Diamond**  
ACID - Acid  
ALK - Alkali  
COR - Corrosive  
OXY - Oxidizer  
☢ - Radioactive

**Reactivity  
Yellow Diamond**  
4-May Detonate  
3-Shock & Heat  
may detonate  
2-Violent Chemical

## Annexure I, II is for your reference (kindly do not print)

### 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 (Give type), Sludge, Fibrin gel,
Polymer	Resin, Alginate, Polystyrene, Polypropylene, PDMS, PVC, Polymeric microspheres, Fibers, Thermoplastic polyurethanes, Polymeric scaffold
Metal	Alloy, Chips, Micro tools, Fractography
Geological	Soil, Flyash, Sand, Activated carbon, Brick, Cement
Nanomaterials	CNT, Nano particles (Give type) , Ferrite
Thin film	Specify the material:_____, Substrate: Glass/ Copper/Conducting material/Silicon wafer
Ceramic or Composite material	Detailed description of the sample/composite material

#### EXAMPLES:

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. aureus
Polymer	polystyrene nanoparticles
Thin film	Material: ZnO/TiO <sub>2</sub> /CZTS substrate: glass
Nanomaterials	Gold nano particles or CNT or
Composite material	CNT in polymer, CNT/ carbon and graphene

**\*\*For Powder sample: Mentioning sample type and sample description is mandatory.**

Cross-section analysis of powder and suspension samples is not possible. For these samples kindly choose **Surface or Cross section** for charges calculation.

### Annexure II

#### Sample preparation instructions for SEM:

- **Sample dimensions** should be less than 12.5 mm x 12.5 mm x 10 mm (height) for obtaining high resolution images.
- **Medium for Dispersion** Ethanol /Methanol / Water /Iso-propyl alcohol. Any other medium should be provided by the user. Dispersion will be done by ultrasonication.
- Kindly **mark the edge** of the sample to be observed for **Cross section**.
- Base of the sample should be flat for mounting on sample holder.
- Biological samples will be accepted only after primarily fixation with suitable fixative.
- Samples should be in dry form. Hydrated samples must be dried properly before sending.
- Sample preparation if any should be done at user end (cutting the sample for CS, freeze fracturing, sample fixation for biological samples, staining of samples, oven drying should be done by the user)
- The samples should withstand high vacuum (~ 10<sup>-5</sup> Pa). **Wet samples cannot be done.**
- For any further query, kindly contact on  
Email: [fegsemlab@iitb.ac.in](mailto:fegsemlab@iitb.ac.in), Contact: 022-2159-6863

### **IMPORTANT NOTE:**

- Users must complete online registration for sample analysis.
- After the online registration is completed, the appointment will be scheduled as per the queue. Partially filled form will not be registered.
- The users will be informed about their date and time of slot by e-mail.
- 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.
- If you are opting only for EDS, the image given along with EDS will not be a high resolution image. IF only WDS is opted providing image of area of analysis is not possible.
- Attach reference images for the sample (if any) with the form.
- After registration, samples can be send by post or submitted in person to **SAIF/CRNTS office, IIT Bombay, Powai, Mumbai-400076.**
- Kindly ensure the registration number is written on the envelope when sending the samples.
- Potentially hazardous/toxic/radioactive samples may not be accepted for analysis.