



# राष्ट्रीय पृथ्वी विज्ञान अध्ययन केन्द्र

## NATIONAL CENTRE FOR EARTH SCIENCE STUDIES

Ministry of Earth Sciences, Government of India

PB No. 7250, Akkulam, Thiruvananthapuram-695011, India

Tel: + 91-471-2511667/1668(XRD)

Email: [xrd@ncess.gov.in](mailto:xrd@ncess.gov.in)

Website: <http://ncess.gov.in/index.php/facilities/laboratories.html>



### XRD ANALYSIS REQUEST FORM

Please submit your request by filling out the form below to the XRD Lab. Details of the sample (format attached) like sample number, name, type, description, locality etc. should invariably accompany this request. All fields must be filled. Strike out inapplicable fields.

Date: \_\_\_\_\_

Name of Indenter : \_\_\_\_\_

Address : \_\_\_\_\_

Project : \_\_\_\_\_

E-mail : \_\_\_\_\_ Mobile Number \_\_\_\_\_

Sample Type :  Soil\*  Rock\*  Sediment\*  Mineral\*  Others (Please Specify) \_\_\_\_\_

No. of Samples : \_\_\_\_\_

Scan Angle (2 $\theta$ ) required	.....	Step Size	.....
Crystallography	Yes/No (Additional service)		
Search & Match using ICSD/JCPDS software	Yes/No (Additional service)		
Phase quantification	Yes/No (Additional service)		

Category of Request\* (✓ tick one)

<input type="checkbox"/> I: Commercial	<input type="checkbox"/> II: R&D Institute	<input type="checkbox"/> III: Research Student	<input type="checkbox"/> IV: NCESS Projects
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\*: Categories I to III are on payment basis. Please check for eligible category and applicable rates (Page 3)

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Name and  
Signature of Indenter

Head  
(Group/Division/Institute/Dept)

Group Head  
(Marine Geoscience Group, NCESS)

### For Office Use Only

Please collect Rs ..... (In words.....)  
towards XRD analytical charges of .....samples under category.....including GST @ 18%.

Mode of payment: .....

Payment reference No: .....

Date: \_\_\_\_\_

Scientist In-Charge XRD  
laboratory, NCESS

**Samples for XRD:** For routine qualitative analysis, supply three to five grams of finely ground and dried sample powders or as coated slide.

<b>Sl No</b>	<b>Sample No</b>	<b>Sample Description including type of pre-processing carried out</b>	<b>Location</b>	<b>Catalog*</b>
1				
2				
3				
4				
5				
6				
7				
8				

Indicate abnormal concentration of any mineral, if known or suspected including hazardous materials. Duplicate this page for more samples. \* For Office use.

.....  
**Name and Signature  
of Indenter**

## ANALYTICAL CHARGES UNDER DIFFERENT CATEGORIES:

**XRD:** Rs 2000/- per sample; Rs 400/- each as additional charge per hour of use of (a) Search & Match analysis using ICSD/JCPDS software, (b) Crystallographic analysis and (c) phase quantification.

Category	User	Charge
I: Commercial	Users from industry/private/commercial organization/consultancy projects.	Full
II: R&D projects	Users from Government organisation/Universities, R&D projects of NCESS with grant in-aid funding	2/5
III: Research Students	Students from outside NCESS, pursuing PG/PhD. programmes	1/5
IV: NCESS	NCESS Institutional projects/Plan projects/ PG/PhD., Students at NCESS	Free

### PLEASE NOTE:

1. Additional GST @ 18% is charged extra.
2. Outstation indenters may send samples, strictly as per the lab requirement, along with the request form directly to the XRD lab. They would be advised by email of charges on completion of the analysis.
3. Analytical charges may be remitted directly by cash at NCESS accounts section or by way of crossed DD drawn in favour of the Director, NCESS, payable at any of the nationalized banks, Thiruvananthapuram.
4. Results are mailed on receipt of the payment or in person by presentation of payment receipt.

### BRIEF USER INFORMATION:

X-ray powder diffraction (XRD) is used for phase identification of crystalline material and to determine unit cell dimensions. It is widely used for identification of crystalline materials like minerals, metals and inorganic compounds. Major applications include (a) characterization of crystallinity, (b) identification of fine-grained minerals that are difficult to determine optically, (c) determination of unit cell dimensions and (d) measurement of sample purity. With specialized techniques, XRD can also be used to (i) determine crystal structures using Rietveld refinement, (ii) determine modal amounts of minerals (quantitative analysis) and (iii) characterize thin film samples.

### LIMITATIONS OF XRD ANALYSIS:

- Homogeneous and single phase material is best for identification of samples
- For mixed materials, detection limit is ~ 2% of sample
- For unit cell determinations, indexing of patterns for non-isometric crystal systems is complicated
- Peak overlay for high angle 'reflections'

### ATTENTION USERS:

**As in the case of any other analytical technique, good sample preparation is essential for performing high-quality analysis using X-ray diffraction.**

- Samples must be few grams and as pure as possible. Mixed samples would provide peaks of different phases together, rendering a reflection of complex spectra. Separation of individual minerals and mineral associations from the composite soil, sediment and rock samples would ensure quality XRD patterns.
- Please refer USGS XRD Manual (<http://pubs.usgs.gov/of/2001/of01-041/>) for preparatory procedures prior to XRD analysis for soil, sediment and bulk mineral samples.

### DELIVERY OF RESULTS:

Each sample needs approximately two hours for the generation of XRD patterns and indexing. All analyses will be carried out on the basis of priority of receipt of samples in the laboratory. It may take few days or weeks, depending on the backlog of samples remaining in the lab for analysis.