



# Indian Institute of Technology Kanpur

## Advanced Center for Materials Science

**Enq. No.: ACMS/ AU/ 2012-13/ E-3**

**Enquiry Dated: March 02, 2013**

**Closing Date: March 18<sup>th</sup>, 2013**

ACMS requires the quotation for **High resolution X-ray diffractometer** (with JADE and ICDD). The equipment should have vertical goniometer with three axis diffractometer to facilitate measurement of rocking curves, X-ray reflectivity and reciprocal space mapping in thin films along with texture and residual stress measurement in bulk samples.

The specifications for the equipment are in the addendum. The closing date for the above item is **March 18<sup>th</sup>, 2013**.

The prospective suppliers are required to send quotation in two parts in sealed envelopes, as “Technical Bid” and “Financial Bid”. The Technical Bid should contain detailed technical specification of the product being offered and should not mention any prices. The Financial Bid should include the detailed price quotation clearly including the cost of the equipment, taxes, service charges if any, shipping and handling charges. The two separate and sealed envelopes should be clearly marked appropriately as “Technical Bid” and “Financial Bid”.

### Terms and Conditions:

1. Maximum education discount, if any should be offered
2. Validity of quotation should be at least for 60 days
3. Prices should be on CIF and FOB separately (if imported)
4. Prices should include the installation and training cost
5. Warranty should be for at least three years after installation
6. Normal payment terms for the Institute will be applicable (90% on delivery of the items and the remaining 10% after satisfactory installation/ inspection)
7. Quotation should carry proper certifications like agency certificate, proprietary certificate, etc.
8. An undertaking that the vendor will supply all the spares and services for the equipment for at least 5 years from the date of commissioning
9. Delivery must be within 6 months (updated March 7<sup>th</sup>, 2013)

Kindly send the Technical and Financial bids in sealed envelopes latest by 18<sup>th</sup> March 2013 to:

**Dr. Anish Upadhyaya**  
**Head, Advanced Center for Materials Sciences**  
**IIT Kanpur, U.P. 208016, India.**  
**e-mail: anishu@iitk.ac.in**

## Technical Specifications for HR-XRD

Sr. No.	Parameter	Requirement*
1	X-Ray safety Cabinet	<ul style="list-style-type: none"> <li>• Front door opening</li> <li>• Lightening system inside the enclosure</li> <li>• Emergency stop pushbutton on front panel</li> <li>• External light Signal</li> </ul>
2	X-ray Generator	<ul style="list-style-type: none"> <li>• Power 3.5 kW</li> <li>• Max. Voltage: 60 kV</li> <li>• Max. Current: 60mA</li> <li>• Can work with 220 V and 50 Hz.</li> <li>• Connection pipe for the cooling system</li> <li>• Water flow management with safety</li> <li>• Window opening controlled by software</li> </ul>
3	X-ray tube	<ul style="list-style-type: none"> <li>• Source: Cu, Co and Cr (2 each)</li> <li>• Focus: Long line and point focus</li> <li>• The tubes should be fast and easily exchangeable without affecting the optical alignment</li> </ul>
4	Goniometric System	<ul style="list-style-type: none"> <li>• Vertical goniometer</li> <li>• The sample stage should be robust to be able to handle solid polycrystalline samples</li> <li>• Additional sample stage for supporting bulk and heavy components for residual stress analysis. Mention the sample dimensions and weight that can be supported</li> <li>• Specify the range of X, Y and Z movement for the sample stage</li> <li>• Eulerian cradle with: <ul style="list-style-type: none"> <li>○ <math>\phi</math>-range: 0 to 360°</li> <li>○ <math>\chi</math>-range of -5 to 90°</li> </ul> </li> <li>• Laser based alignment of sample</li> </ul>
5	X-Ray beam Optics	<ul style="list-style-type: none"> <li>• Geometries: Brag Brentano (BB) and Parallel Beam (PB) for both Cu and Co (optional) radiations</li> <li>• Filters: Suitable <math>\beta</math>-filters for both Cu and Co radiations</li> <li>• Adjustable slits at the incidence side as well as receiving side. The slit widths should be independently as well as continuously varied.</li> <li>• Easy change of optics without the need of alignment from BB to PB.</li> </ul>

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		<ul style="list-style-type: none"> <li>• Soller slit and Soller collimator</li> <li>• X-ray mirror</li> <li>• 2 bounce monochromator Ge 022</li> <li>• Polycapillary 50 micron (optional)</li> <li>• Three axis diffractometer to perform reciprocal space mapping with high resolution.</li> </ul>
<p><b>Different optical geometries including primary, secondary and sample stages should be easily exchangeable by the user to go from texture/residual stress to thin film mode. Ability to carry out texture, residual stress, thin film X-ray reflectivity, rocking curve determination and reciprocal space mapping is mandatory.</b></p>		
6	Detector	0-D point detector and 1-D Position sensitive detector
7	Software	<ul style="list-style-type: none"> <li>• The software should be on Windows operating system and the output files should be retrievable to commonly used software such as Excel.</li> <li>• The basic software provided should fulfill the following minimum application requirements: <ul style="list-style-type: none"> <li>○ control of instrument parameters</li> <li>○ data acquisition, analysis and processing</li> </ul> </li> <li>• JADE software (5 year network license with all modules included)</li> <li>• ICDD database</li> <li>• Software for texture analysis and residual stress</li> <li>• Software for rocking curve, reciprocal space mapping and X-ray reflectivity.</li> </ul>
8	Calibration	<ul style="list-style-type: none"> <li>• Specify extent of calibration required and traceability and validity of calibration at the time of installation</li> <li>• Specify calibration requirements after the initial validity</li> <li>• Si {111} or equivalent for HRXRD and poly-silicon or equivalent sample for texture (peak position)</li> </ul>
9	Hot stage (optional)	Controlled atmosphere with temperature to 1200° C with cooling facility
10	Spares	<ul style="list-style-type: none"> <li>• List of standard spares to be provided for each year starting from 1st to 5th year along with cost and discounted rates</li> <li>• An undertaking that the vendor will supply all the spares and services for the equipment for at least 5 years from the date of commissioning</li> </ul>

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11	Chiller	<ul style="list-style-type: none"> <li>A suitable chiller compatible with the main instrument. Make and Detailed specifications to be provided with installation requirements.</li> </ul>
12	Power backup	Work with 220 V and 50 Hz. UPS is required as a power backup for electronics and chiller
13	Computer and printers	<ul style="list-style-type: none"> <li>Computer compatible with the system and capable of handling the relevant software</li> <li>Specify the configurations of the computers (2 PC for data acquisition and analysis) with sufficient RAM (&gt;4Gb) and memory (&gt;500Gb) and optional printers</li> <li>High speed data acquisition system. Results to be displayed after each measurements simultaneously</li> </ul>
14	Training and Installation	<ul style="list-style-type: none"> <li>Installation and training should be done only by well trained factory engineers.</li> <li>The supplier should provide training to at least two candidates at manufacturer's location as well as at the installation site to make them familiar with smooth operation of the instrument.</li> </ul>
15	After Sales Service	<ul style="list-style-type: none"> <li>The supplier should provide a prompt after-sales service such as regular instrument maintenance, trouble shooting and fixing.</li> <li>The list of service centers in India should be included.</li> </ul>
16	List of Existing Users	<ul style="list-style-type: none"> <li>A list of XRD systems supplied by the manufacturer of similar model in India and abroad should be provided.</li> </ul>
17	Additional Information Needed	<ul style="list-style-type: none"> <li>Profile of company</li> <li>Specify safety measures to be taken during operation, storage and transportation.</li> <li>Necessary hardware and software for determination of X ray elastic constants of various materials</li> </ul>
18.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference
<p><b>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</b></p>		