

DEPARTMENT OF CHEMISTRY  
INDIAN INSTITUTE OF TECHNOLOGY - DELHI  
HAUZ KHAS, NEW DELHI - 110016

Dated: 2<sup>nd</sup> Aug 2013

**NOTICE INVITING QUOTATIONS – DATE EXTENSION**

**Sub: Purchase of Benchtop SEM/TEM**

Sealed quotations in *separate envelops of technical and commercial bid* kept in a one sealed outer envelope are invited for purchase of a **Benchtop SEM/TEM** as per specifications given below. Your sealed quotation should reach latest by 5 PM on 17<sup>th</sup> September 2013 to **Dr Sameer Sapra, Department of Chemistry, Indian Institute of Technology – Delhi (IIT Delhi), Hauz Khas, New Delhi - 110016**. Your quotation should be superscribed “Purchase of **Benchtop SEM/TEM** due on 17<sup>th</sup> September 2013”.

**SPECIFICATIONS**

Multi-modal imaging system should include TEM, SEM, ED, STEM modes for observation of ultra-small structure, nano particles, surface details and diffraction patterns. It should be able to work without compressor and cooling water supply.

**Technical specifications**

Nominal accelerating voltage	5 Kv
Electron source	field emission gun
Beam current	5-10 $\mu$ A
<b>ELECTRON OPTICS</b>	No cooling water required

**CONDENSER LENS**

Focal length*	3 to 5 mm
The smallest illuminated area	100 nm
Condenser aperture	small

**OBJECTIVE LENS**

Focal length*	1 to 2 mm
Cs (spherical aberration coefficient)	less than 2 mm
Cc (chromatic aberration coefficient)	less than 2 mm
Objective aperture	less than 50 $\mu$ m

**PERMANENT MAGNET**

3 to 5 mm

100 nm

small

**PERMANENT MAGNET**

1 to 2 mm

less than 2 mm

less than 2 mm

less than 50 $\mu$ m

**PROJECTION LENS**

Magnification on the YAG screen

Electron Gun

Current density

**ELECTROSTATIC**

30 to 500 X

CE Cathode ZrO/W[100]

less than 0.2 mA

Lifetime > 2,000 hours

### **IMAGE CAPTURE**

Camera 2 K cooled progressive- scan interline CCD sensor  
(7.4  $\mu\text{m}$  x 7.4  $\mu\text{m}$  pixel size)

Pixel size 2048 x 2048 pixels, 12 bits digitalization

Image software image progressive procedures, such as summing, FFT, histogram, Gamma correction, and automatic contrast adjustment, Pixel size should be 7.4 x 7.4  $\mu\text{m}$

### **IMAGING MODES**

#### **TEM MODE**

Accelerating voltage 5kV electron source should be of contrast of light elements in natural states (with unstained sample)

Resolving power 2.5 nm

Total magnification 1,500 – 150,000x

Beam spot 100 nm (diffraction mode)

#### **SEM MODE (BSE DETECTOR)**

Operating voltage 5kV

Electron resource Field emission gun

Resolving power 4 nm

Min.magnification (200X200 $\mu\text{m}$ )X800

Max. magnification 800,000x

Beam spot 2 nm

#### **BUILT IN ED**

Minimum probe size 100 nm

Diffraction lens Magnification 3.5

#### **VACCUM**

Airlock System

Diaphragm and turbomolecular pump 10<sup>-5</sup> mbar

#### **OBJECT SPACE**

Ion getter pump (10<sup>-3</sup> sec) 10<sup>-8</sup> mbar

## **ELECTRON GUN**

Ion getter pump (7 | sec -1)

10-9 mbar

**Necessary pc, consumables & manual tool should be supplied with system**

## **STEM**

**Resolving power**

**2.0nm**

**Minimum magnification**

**(25 X25  $\mu$ m) 6,000X**

**Tilt**

**+/-22 deg**

## **TERMS AND CONDITIONS**

1. Please submit the TECHNICAL and FINANCIAL bids in separate sealed envelopes. Mark the two envelopes clearly as "Technical Bid" and "Financial Bid". Both the sealed envelopes should be sent in a single sealed envelope, clearly marked as "Quotations for Purchase of benchtop SEM/TEM due on 17<sup>th</sup> September 2013". The quote should reach the following address on or before 17<sup>th</sup> September 2013, upto 5 PM.

Dr. Sameer Sapra  
Department of Chemistry  
Indian Institute of Technology Delhi (IIT Delhi)  
Hauz Khas, New Delhi-110016

2. Please quote prices at FOB New Delhi, inclusive of installation charges. CIP charges should be quoted separately.
3. The quotations should be in the currency of the country of origin as well as Indian Rupees wherever possible and should be valid for at least six months.
4. Please attach all the technical literature and a list of similar installations done in India.
5. Standard warranty details (**minimum 3 years**) should be provided.
6. Payment should be through irrevocable letter of credit.
7. If the quote is being submitted by the representative of the Principals/manufacturer themselves, a valid Agency ship/Dealership Certificate authorizing the agent to quote to IIT Delhi on behalf of the Principals should be enclosed.
8. Complete set of manuals for the operation of equipment should be given.
9. Clearly specify the installation requirements—such as space, power, frequency, environment (Temperature and humidity) etc.
10. If the items quoted are proprietary in nature, please enclose proprietary certificate from the principals stating "certified that \_\_\_\_\_ is a proprietary item M/s. \_\_\_\_\_ and no other manufacturer makes these items.
11. If the bidder is an Indian agent, the agency certificate should be enclosed.
12. Please produce compliance certificate for the specification.
13. Training should be provided free of cost.
14. Delivery period should be specifically mentioned and should be as small as possible.

15. The products will be used for educational purposes. Hence any applicable institutional discounts should be offered and stated.
16. SALES TAX :ThisInstitute is not exempted from the payment of Sales Tax/Service Tax/VAT. The rate (i.e. percentage ofSales Tax should be clearly indicated included or excluded) wherever chargeable.
17. Institute reserves the right to accept or reject any or all the quotations without assigning reasons thereof.