RAJIV GANDHI INSTITUTE OF PETROLEUM TECHNOLOGY, RAEBARELI

Dated: 16.11.2015

CORRIGENDUM

For Procurement of Atomic Force Microscope

Tender No. RGIPT/RBL/LabEquipment/2015-16/13

Pre-Bid Meeting held on : 13.11.2015

Last date of Submission of Bids : 08.12.2015 (Tuesday) upto 03.30 pm

Opening of Techno-Commercial Bid : 08.12.2015 (Tuesday) at 04.30 pm

The Standing Technical Committee meeting was held on 13th November 2015 after the Pre-Bid meeting to finalize the revised technical specifications of Atomic Force Microscope (AFM). ***The Technical Specification was modified as per the input received in the Pre-Bid meeting from different vendors***.

Revised Technical Specification: Atomic Force Microscope
<u>Scanner</u> • X,Y, and Z must have closed-loop feedback, with an option for open-loop mode. • X-Y range of 90 microns • Z-range of 10 microns, with/without extension, for both imaging and characterization modes. • Z-sensor noise-floor < 0.5 nm across the 0.1 Hz to 1 kHz bandwidth • Above-mentioned noise-floor should be demonstrably independent of Z-travel, in repetitive Z-scan tests. • Compatible with all scanning/force spectroscopy operating modes (as listed below). • X-Y and Z motions should be mutually independent and to be controlled by piezo sensors. • Up to sample size = 50 mm in diameter and 10 mm in height. • Motorized Z movement
<u>Operating modes</u> • Following modes of operation must be available: a) Contact (lateral force, topography, deflection, feedback error, one auxiliary) b) Force Curve Mode (Time, deflection, force, piezo position, event-time) c) Lateral Force Mode (LFM) d) AC Mode (Tapping Mode) e) Phase Imaging f) Nanolithography/ Nanomanipulation

g) Electric Force Microscopy (EFM)
h) Kelvin Probe Force Microscopy (KPFM)
i) Magnetic Force Microscopy (MFM)
j) Piezo-response Force Microscopy (PFM)
k) AC Mode with Q-control
l) Force Mapping Model

<u>Optical Lever Light Source</u>

• The instrument optical lever arm must use a low coherence light source or equivalent (for example, a super luminescent diode, SLD, Laser) to reduce artifacts from optical interference effects.
• The instrument must use an infrared SLD (or equivalent) for the optical lever arm to eliminate optical crosstalk with epi- and transmission-fluorescence measurements.

System Optics
• View of the cantilever and sample from above or below.
• Must have field-of-view between 250 microns and 700 microns.

Software
• System must use at least 24-bit digital to-analog converters (DACs) in order to generate the XY and Z piezo scan signals.
• Control and analysis must be user programmable natively in an entirely open-source software programming language.
• Software must include a one-click configuration tool that sets up the software for both standard and userdefined operation modes.
• Capable of recording individual image sizes of 4000x4000 pixels2 or greater.
• AFM control software must include 3D rendering for image display.
• Allow the user to generate, display, visualize, and export color-coded 3D & 4D real-time scan images, as well as offline processing, exported in commonly compatible formats such as .xls, or .mat
files.
• Must include drift compensation module.
• Drift compensation must be available for each operational mode.
• Software must allow a region of interest to be tracked in real time to within 1nm of precision while eliminating any scan distortion in the image modulation voltage inputs compatible with external hardware.
• Must include auto-configuration of external hardware and accessories.
• Device parameters must be stored in non-volatile RAM on the device itself and read into the software when the device is plugged in.
• Allow multi-frequency AC mode (tapping mode) operation with two specific driving frequencies and amplifiers to measure the amplitude and phase response at both these frequencies.
• Must include or optionally support (specify which) an imaging mode that is capable of generating quantitative maps of storage and loss modulus, and loss tangent (loss modulus

divided by storage
modulus), at high pixel resolution (at least 1024x1024 pixels).
• Data capture must occur during normal AC mode imaging of topography at normal scan rates.

AFM Controller and Electronics
• Allow thermal tuning of the cantilevers of the softest available cantilever, up to at least 0.5 MHz.
• Must include software controlled relays for the X, Y and Z high voltage supplies and the laser power.

Warranty, Support, and Services
• 24 month warranty on all parts and labor.
• Free AFM software upgrades for the life of the instrument.
• Local application and service support in India from the manufacturer or from authorized distributors.
• Offer must include user-training every 6 months, for at least 18 months from the date of installation, not counting the training-session provided to users upon installation.
• Training must cover all aspects of AFM operation and trouble-shooting, and must dedicate separate time-slots for every specialized mode of operation.
• The duration of each such specialized training time-slot must be agreed to be at the discretion of the buyer.
• Standard AFM cantilever must be provided by the support-staff at the time of training sessions.
• At least 50 standard AFM tips to be provided as accessories, for the initial period.
• Vibration isolation set up
• The vendor must have supplied at least 10 numbers of the quoted model in India.

Optional

2. Environmental chamber in Main scope.

I. Temperature stage -30 °C to +250 °C

Sd/-
Stores & Purchase Officer