AFM - Atomic Force Microscope

Signature Sheet

Student's Name _____ Partner's Name _____

Pre-Lab Discussion Questions

It is your responsibility to discuss this lab with an instructor before your first day of your scheduled lab period. This signed sheet must be included as the first page of your report. Without it you will lose grade points. You should be prepared to discuss at least the following before you come to lab:

1. What are the major components of an AFM? How do they work together to form an image of the sample surface in Vibrating and Non-Vibrating mode? Which mode will you use in which part of this experiment?
2. How does AFM differ from other forms of microscopy (e.g. SEM or optical)? What are some of the advantages and disadvantages?
3. What is a piezoelectric scanner? Why are they used in our AFM?
4. Draw, and briefly explain the different features of the typical Force-Distance curve for a material. Be sure to note the attractive and repulsive regions. Which AFM modes operate in each region?
5. Explain what the important parameters do in the Pre-Scan, Topo Scan, and System tab (frequency select, manual Z motor control, automated tip approach, range check, scan lines, scan size, rotation, Z feedback, display, HV Z gain, XY parameters, tip approach parameters, calibration)
6. Give examples of two scenarios where you are likely to break a tip.

Staff Signature _____ Date _____

Completed before the first day of lab? (Circle one) Yes / No

Mid-Lab Discussion Questions

On day 2 of this lab, you should have the ability to scan samples accurately and reliably. Show a processed topography scan of the calibration sample to an instructor. Take a profile of a row of features to show that your measurements and calibrations are correct. How close are your measurements compared with the datasheet?

1. What is a scanned images orientation relative to the cameras view orientation? How does Scan Rotation change this?
2. Which direction does the scanned image move if you move the physical sample to the left? What about if you move the physical sample up?

Staff Signature _____ Date _____

Completed by day 2 of lab? (Circle one) Yes / No

Checkpoint Signatures

1. Alignments

   Staff Signature _____

2. Pre-Scan Settings

   Staff Signature _____

3. Calibration

   Staff Signature _____

4. CD/DVD

   Staff Signature _____

5. Boltzmann's Constant

   Staff Signature _____