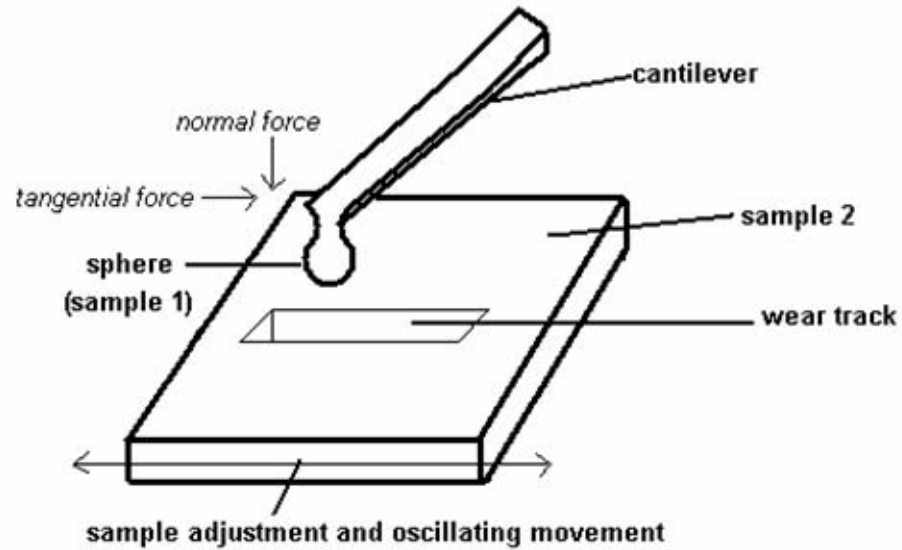# Chapter – 15

NANOTRIBIOLOGY

Figure 1. A nanotribometer being used to study the wear of sample element 2 by sample element 1, spherical in shape. The tangential force causes a deflection in the cantilever (attached to the ball) and this gives the measure of the friction force (by using a traducer). By studying the wear tracks, wear coefficients are obtained.
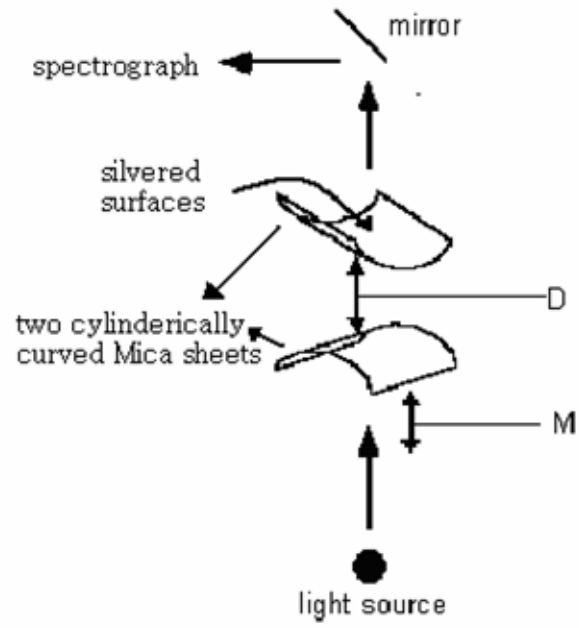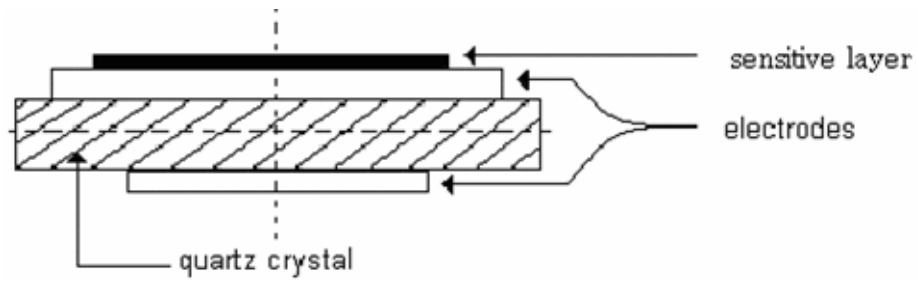
Figure 2. Schematic of a SFA (top view).

Figure 3. Schematic of a quartz resonator working in shear mode. The standard quartz crystal has a gold sensor surface. Other surfaces are available such as metals, polymers and chemically modified surfaces.
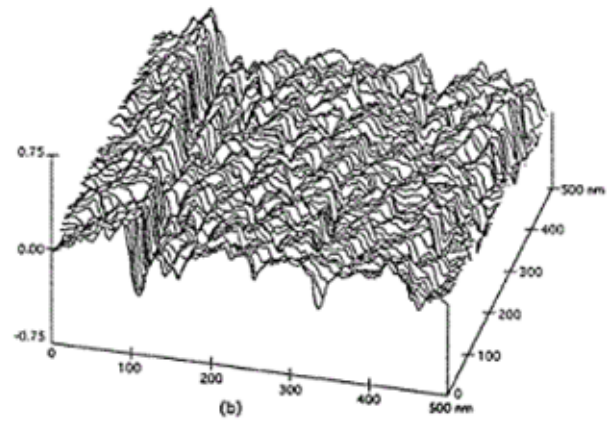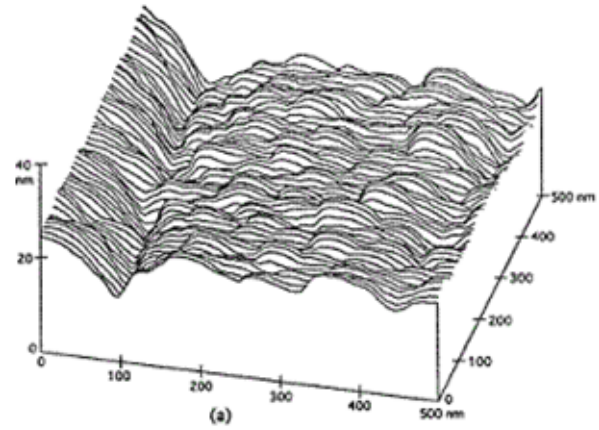
Figure 4. Comparison between the roughness and friction force scan. (a) Roughness scans of a surface,   (b) friction force scan of the same surface. (Bharat Bhushan, Wear 225-229 (1999) 465-492).
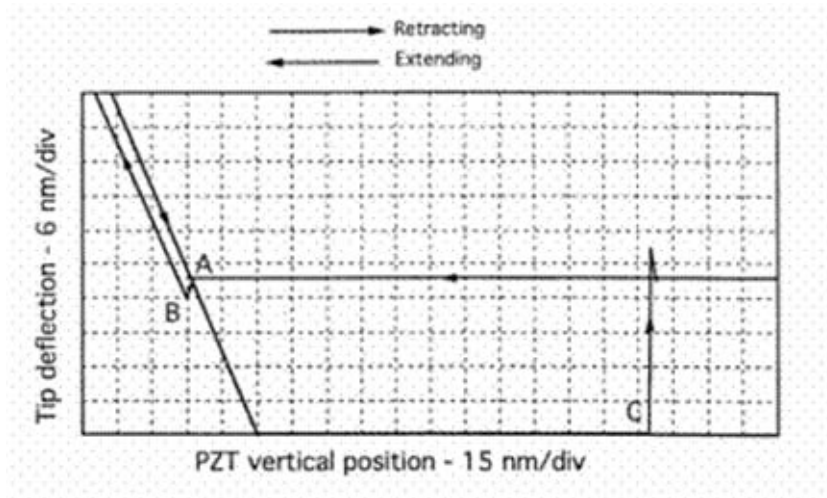
Figure 5. A deflection Vs distance curve obtained to measure the adhesive force. (Bharat Bhushan, Wear 225-229 (1999) 465-492).
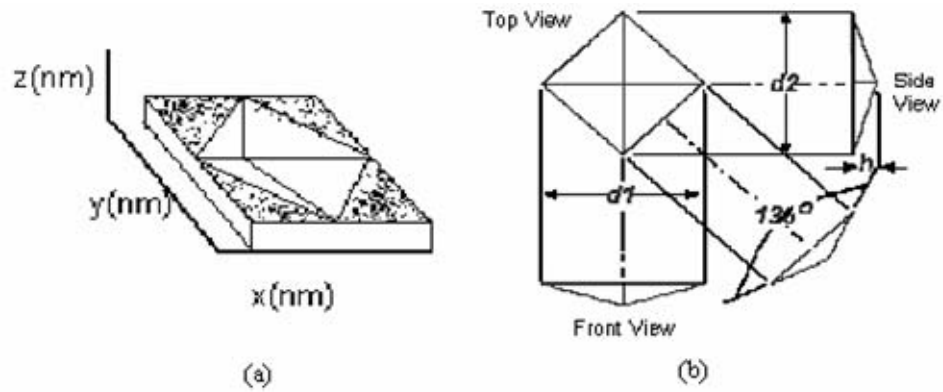
Figure 6. (a)A schematic showing an indent made by the pyramidal (136^0) AFM tip and (b) the projected area of the indent.
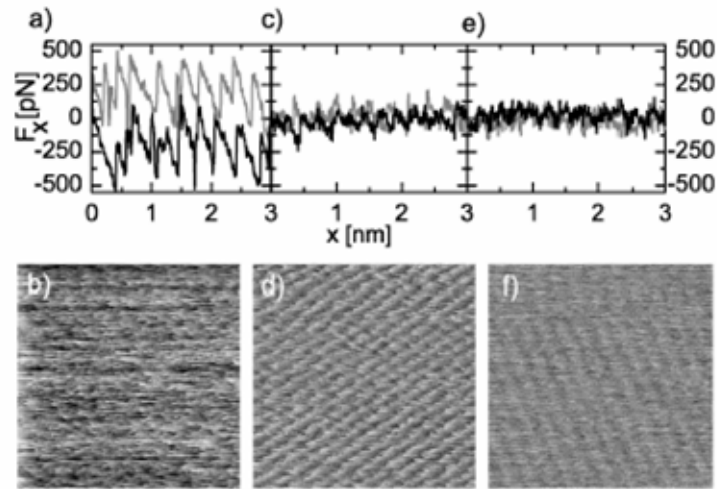
Figure 7. Friction loops (black, forward & grey reverse) and lateral force images (forward) measured along scanning direction at tip- surface orientation angles of (a), (b) 60 degrees; (c),(d) 72 degrees; (e),(f) 38 degrees. (Martin Dienwiebel, Namboodiri Pradeep, Gertjan S. Verhoeven, Henny W. Zandbergen, Joost W.M. Freken, Phys. Rev. Lett. 92 (2004) 126101).
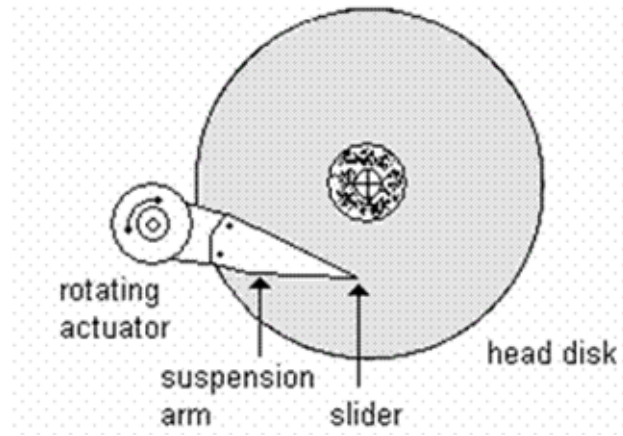
Figure 8. The image of a typical PC hard disk. The head (slider) and the disk can be clearly seen.
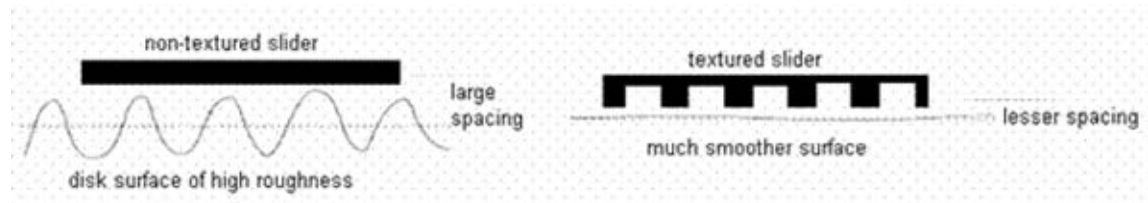
Figure 9. Reducing stiction by texturing slider rather than compromising for rough disk surface.
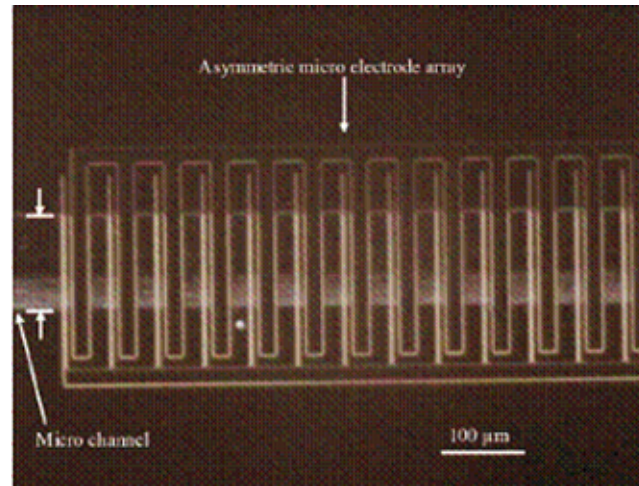
Figure 10. A microscopic picture of fabricated micro-fluidic devices (a micro-electro mechanical system) shows a 100 mm width channel and asymmetric micro-electrode array, (Marshal Dhayal, Hyung Gon Jeong, Jeong Sik Choi, Appl. Surf. Sci. 252 (2005) 1710-1715).