

Measurements liquid environment (by modified SMENA head)

Dependence of amplitude of cantilever oscillations on frequency in fluids significantly differs from the one in air. Frequency characteristic of cantilever in fluid is a combination of peaks - so called "the forest of peaks" (Fig.1). Such form is explained from excitations of mechanical resonances in the cantilever holder, which is immersed into the fluid. It is recommended to obtain the frequency characteristic of cantilever depending on distance from surface (Fig.2). It can be found the peaks, whose amplitude reduce during approaching to the surface. Such peaks are suitable for semicontacting in fluid. For considered case (Fig.2) suitable frequency is about 14kHz. The better cantilevers for semicontact mode in fluid are relatively soft cantilevers ($k < 1 \text{ N/m}$).

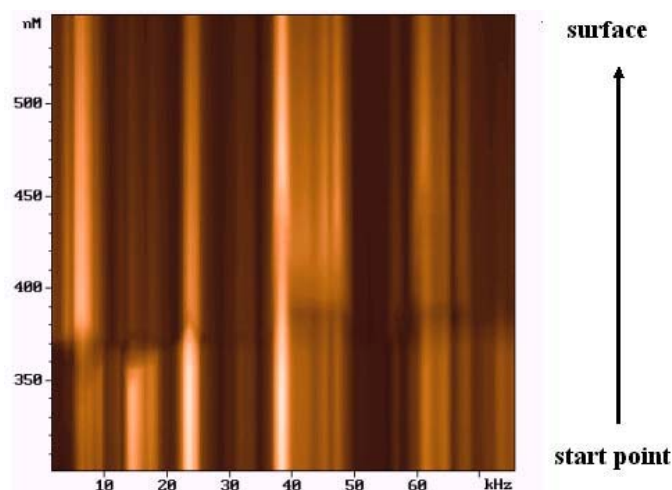
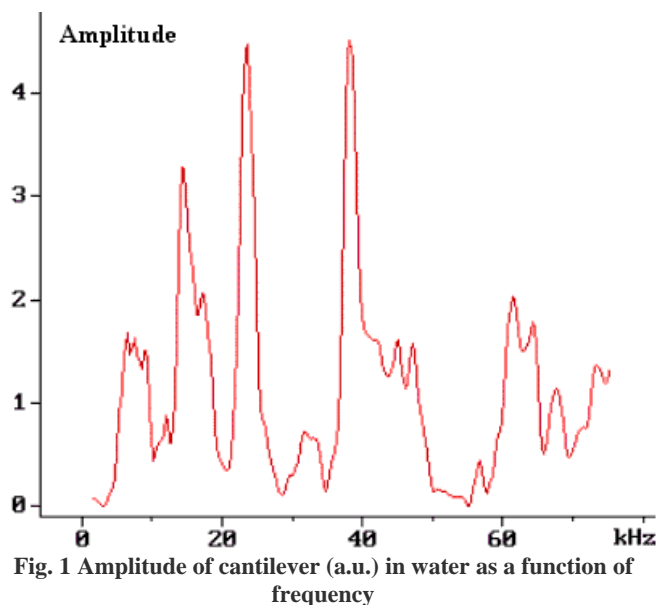
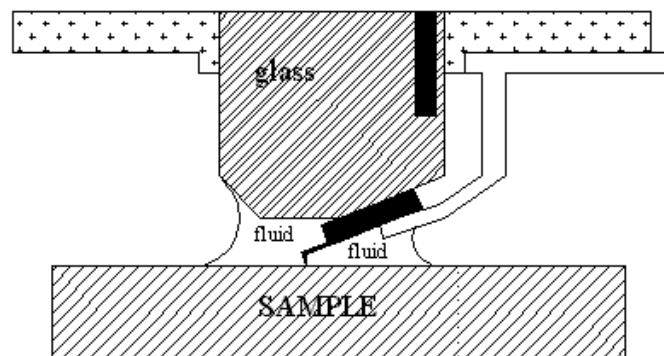


Fig. 2. Frequency characteristic of cantilever in water depending on distance from surface. Brighter areas correspond to the larger amplitude. Right axis indicate distance from start point. Arrow indicates the direction of cantilever movement

One of the important advantages of this design is possibility of measurement both in drop of the fluid placed on the sample surface, and in the vessel filled by fluid. First method is often much more convenient (Fig.3).



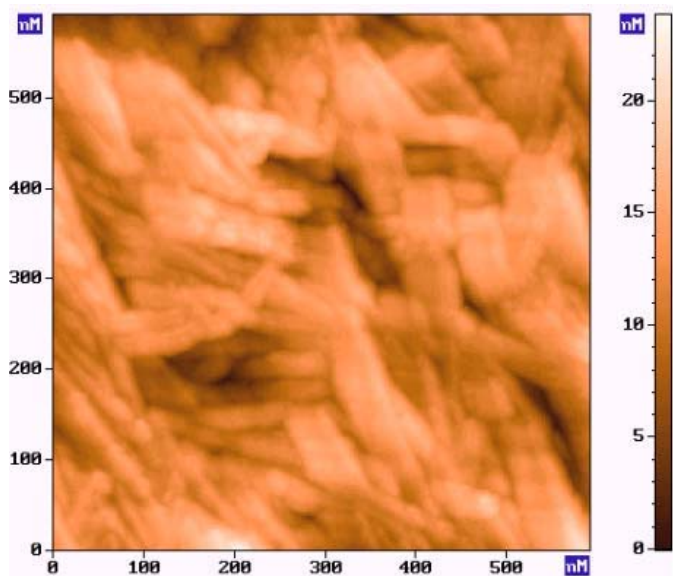


Fig. 4 Lamellar structure of spherulite of block-copolymer polybutyltereftalat-polytetrametilenoxide. Image obtained in semicontact mode in water (frequency 47kHz)

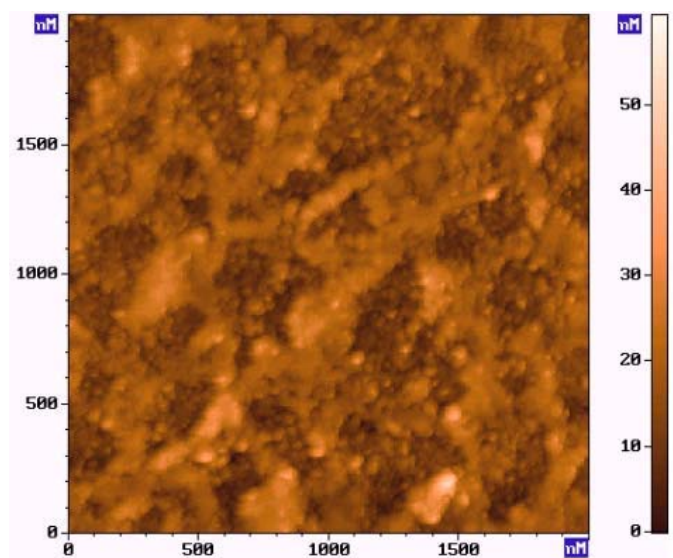


Fig. 5 Structure of film of graphitized polytetrafluoroetilene deposited on silicon surface by rubbing. Image obtained in semicontact mode in water (frequency 22kHz). Grains with diameter 20-40nm are good seen

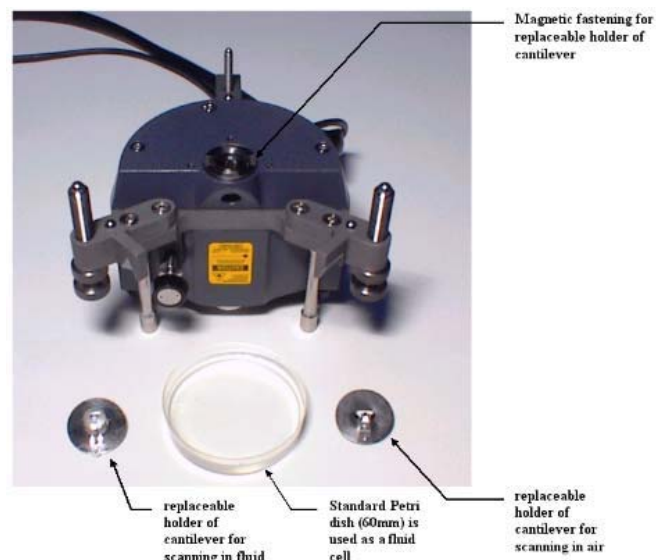


Fig. 6

During scanning the laser ray penetrates the glass, which is immersed in fluid. Because of that surface of water does not have an influence on measurements.

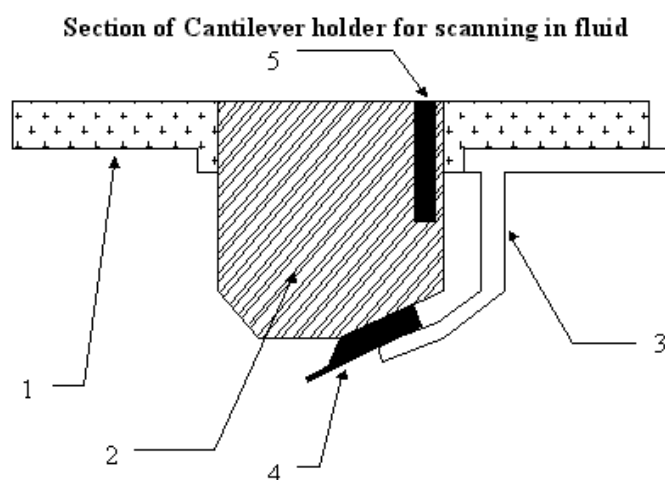


Fig. 7. 1- frame from magnetic material; 2 - glass; 3 - clamp for cantilever; 4 - cantilever; 5 - piezoelectric actuator

See Flash model «[Working with liquid cell](#)»

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