Surface Phonons studied by High Resolution Energy Loss Spectroscopy (HREELS)

Chuhei OSHIMA

Dept. Applied Phys. Fac.Sci.and Eng.Waseda Uni.

3-4-1, Okubo, Shinjuku-ku, Tokyo 169, JAPAN

In this talk, our recent progress in experiment study on microscopic surface phonons has been reviewed. After the brief introduction concerning the concept of surface phonons, exprimental apparatus of HREELS and the principle of the measurment for surface phonon dispersions, I show the experimental data of some solide surfaces.The following points are discussed ;(1) lattice dynamical analysis of the phonon dispersions of some transition metal carbide (100) surfaces indicates the large changes in the force constant near the surface, which is consistent with a rippled structure of a topmost layer. (2) the phonon dispersions of a graphite overlayer show the modified phonon structure, which indicates that the thickness of the overlayer is one atomic layer, and in addition, the electronic structure is also modified. (3) The phonon structure of LaB_6 (100) surface is discussed.

Lastly I tell about new technology of extreme high vaccum less than 10^{-10} Pa.