

PE7

Electron Tunneling through Ultrathin Water Layer Studied by
STM

아주 얇은 물층의 전자투과 현상에 관한 주사터널링현미경 연구

강 현, 홍 영아, 한 재량
포항공과대학교 화학과

Electron transfer from a charged surface to water is an important subject related to electrochemistry and biological functions. The electric field strength inside an ultrathin junction of scanning tunneling microscope (STM) is similar to that near an electrode surface, and is sufficient to reorient the dipoles of the first-layer water molecules at the interface. We measured the local barrier height for electron tunneling across the aqueous junction of STM. At a junction distance of water monolayer, the barrier height strongly depends on the polarity of applied bias voltage. For positive sample bias, the barrier height strongly increases with bias voltage, reaching up to several eV at a bias of 0.6 V. Such bias-dependency manifests the presence of a dipole-oriented water layer at the surface. It also supports the three-dimensional nature of electron tunneling through a water layer, proposed from recent theoretical studies.