

High resolution surface imaging in SPM using two-photon photopolymerized tips

박강민, 구승만, 이상록, 김우식¹, 장상목, 김종민*
동아대학교; ¹경희대학교
(jmkim3@daunet.donga.ac.kr*)

A hydrophobic polymeric tip of atomic force microscopy has been fabricated by two-photon adsorbed photopolymerization methods (TPAP). The fabrication was performed by a layer-by-layer polymerization of sliced multiple three-dimensional computer-aided design data. The used base resin was composed of acrylate and epoxy, which showed hydrophobic properties after the photopolymerization. For the sharp tip fabrication, we used a “dynamic partial polymerization method” which applied “the threshold effect” of TPAP to maximize the fabrication resolution. To investigate the performance of the fabricated polymeric tip, we have imaged several organic, inorganic, and biological samples using contact or dynamic force mode. The imaging results showed the hydrophobic polymeric tips solved various problems related to the tip adhesion to hydrophilic sample surfaces. Finally, the topographic image resolution of sub-5 nm was obtained using the polymeric tips for the hydrophilic mica surface.