

Evaporation of water droplets from hydrophobic and hydrophilic nanoporous AAO cantilevers

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Nanoporous anodic aluminum oxide (AAO) microcantilever were fabricated to investigate evaporation dynamics of water droplet from the nanoporous structures. The surfaces of fabricated AAO structures were modified by UV irradiation or n-octyltrichlorosilane to be hydrophilic or hydrophobic, respectively. A picoliter water droplet was spotted onto the AAO microcantilever and the following variations of the resonance frequency and deflection were measured during water droplet evaporation. The water evaporation phenomena on hydrophobic AAO cantilever was similar to that on hydrophobic silicon cantilever. However, the evaporation dynamics on hydrophilic AAO cantilever was found to be significantly different from that on a hydrophobic AAO cantilever due to the permeation of water into the hydrophilic nanowells.