Morphology Control of Nanostructured $CaCO_3$ Thin Films Though the Tuning of Phase Transformation Conditions

안지혜, 염봉준, 차국헌*
서울대학교
(khchar@plaza.snu.ac.kr*)

Biomineralization processes have attracted significant attention in recent years due to their natural capability to build biominerals with highly ordered nanostructures. To mimic the natural biomineralization, there have been extensive efforts to synthesize artificial nanostructured biominerals, most notably calcium carbonate ($CaCO_3$), one of the most abundant major components in biomaterials. However, morphology control of the nanostructures in $CaCO_3$ thin films has not been studied in detail. In the present study, nanostructured calcium carbonate (NCC) thin films were synthesized at the surface of urease-embedded multilayers prepared by the layer-by-layer deposition. Once amorphous calcium carbonate (ACC) thin films were successfully grown onto the surface of urease-containing multilayers, the ACC thin films were immediately placed in an environment-controlled chamber to induce the phase transformation of the ACC thin films into nanostructured crystalline $CaCO_3$ thin films. To investigate the effects of phase transformation condition on the morphology of NCC thin films, the structure of $CaCO_3$ thin films was characterized by XRD, SEM, and TEM.