Biomimetic Synthesis of Gallium Nanoparticles at Low Temperature

이인호[1,2], 김형태[1], 권순일[1,2], 안성준[1,2], 김종학[1,2],
이상엽[1,2,*]
[1]연세대학교 화공생명공학과; [2]수소·연료전지특성화대학원
(leessy@yonsei.ac.kr*)

Creation of nanoscaled materials with low energy consumption has led to a growing interest in the area of biomineralization. Process of biomineralization and assembly of nanostructured inorganic components into desirable structures has led to the development of a variety of approaches that mimic the recognition and nucleation capabilities found in biomolecules for inorganic material synthesis. In this study, enzyme-mimicking dipeptides hydrolyzing metal ion precursors were used as additives for the mineralizaion of gallium oxide and oxohydroxide. The dipeptides containing His and Ser are worked as catalysts. The molecular interaction between hydroxyl and imidazole groups in the amino acid residues promotes the hydrolysis of metal precursor resulting in changes in shape and crystalline structure. Using this enzymatic peptides, both morphology and crystalline structure controls on semiconductor gallium oxide was achieved at room temperature. The gallium products were influenced by the molar concentration, ratio of dipeptides and pH. This enzymatic dipeptides could be applied for the benign processes of various metal oxides.