Hydrothermal synthesis of adenosine triphosphate stabilized amorphous calcium phosphate nanoparticles

한지훈, 정성욱†
부산대학교
(sungwook.chung@pusan.ac.kr†)

Amorphous calcium phosphate (ACP) is an amorphous phase of calcium phosphate. In an aqueous environment, ACP is easily transformed into crystalline phases such as hydroxyapatite, a major component of vertebrate bones and teeth, due to the nucleation and growth of crystalline domains. The unique role of ACP during the formation of mineralized tissues makes ACP a promising candidate for repairing and regenerating bones and teeth. Understanding the amorphous-to-crystalline transformation of ACP is crucial towards the grand challenge of decoding the secrets of how mineralized tissues form. Therefore, one must be able to prepare ACP with a well-defined geometry and an enhanced stability in order to utilize as a generic platform to study the transformation processes.

Here, we use hydrothermal synthetic routes to stable ACP nanoparticles in the presence of adenosine triphosphate as a stabilizer. As-prepared ACP nanoparticles have been characterized by means of various microscopic and spectroscopic tools. Results of structural and spectroscopic data of ACP nanoparticles as well as the effects of solution compositions, reaction conditions, stabilizers will be discussed.