

Hydrothermal synthesis of calcium phosphate nanostructures with calcium phytate as a precursor

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Calcium phosphate (CaP) includes various salts of tribasic phosphoric acid (H_3PO_4). Their natural occurrence in vertebrate skeletal tissues and teeth makes them of interest. Synthetic CaP biomaterials are known for their use as suitable bone and teeth substitutes due to their biocompatible, bioactive, and osteoconductive characteristics. Their properties are governed by chemical composition, structure, crystallinity, and morphology. We develop synthetic routes towards calcium phosphate nanostructures via calcium phytate as a precursor. Calcium phytate can be synthesized from inositol hexakisphosphate (IP_6) known as phytate because IP_6 contains six phosphate groups, which can bind calcium ions to form intermediate complexes. CaP nanostructures synthesized from calcium phytate show distinctive rod-like morphology, which is indicative of crystalline apatite phase. As-prepared CaP nanostructures have been characterized using various microscopic and spectroscopic tools. Results of the data of CaP nanostructures, as well as the effects of solution compositions, reaction conditions, chemical additives, will be discussed in addition to the possible mechanisms of their formation.