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One pot and two step synthesis of 1D and 2D calcium phosphates and their biomedical characteristics

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Calcium phosphate compounds are widely used in bone tissue reparation, engineering, and lately as component of composite drug carriers and sensors. One of the most used methods for synthesis of designed calcium phosphate nanostructures, such as nanowires and tubes, is hydrothermal method. Two different procedures based on this method were used to synthesize hydroxyapatite nanowires. We performed one pot and two step procedures to successfully produce 1D and 2D calcium phosphate compounds with controlled structural and morphological characteristics. The range of techniques such as electron microscopies, XRD, FTIR and laser diffraction were used to induce the properties and formation mechanism of such nanostructures. Compared with one pot, the two step process via DCP platelets as precursor enables more efficient control over HA particle sizes and uniformity. The synthesized 2D DCP and 1D HA particles demonstrated remarkable biocompatibility and no decrease in viability of osteoblastic MC3T3-E1 cells in 2D culture.