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Biomimetic fabrication of mulberry-like nano-hydroxyapatite with high specific surface area templated by dual-hydrophilic block copolymer

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Abstract:

Novel porous and mulberry-like hydroxyapatite (HAp) nanoparticles with three-dimensionally hierarchical microstructures were developed by using the dual-hydrophilic block copolymer poly (methacrylate acid)-*b*-poly [*N*-(2-methacryloyloxyethyl) pyrrolidone] (PMAA-*b*-PNMP) as the template. It was found that the morphology and Ca/P ratio of synthesized HAp was highly related to the concentration of block copolymer and solution pH, respectively. The morphological evolution of HAp nanoparticles in different conditions was investigated systematically by scanning electron microscopy (SEM), transmission electron microscope (TEM), high-resolution transmission electron microscope (HRTEM), powder X-ray diffraction (XRD), and Fourier transform infrared spectroscopy (FTIR). The possible mechanism of PMAA-*b*-PNMP assisted mulberry-like HAp formation was also proposed based on the time-dependent TEM results.

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