

Fabrication and characterization of 1D brushite nanomaterials via sucrose ester reverse microemulsion.

ABSTRACT

In the present study, 1-dimensional (1D) brushite nanomaterials were fabricated through sucrose ester based reverse microemulsion for the first time. X-ray diffraction patterns revealed that the nanomaterials possessed brushite crystal phase with trace amount of hydroxyapatite. The size and morphology of brushite crystals were governed by the changes in the aqueous-to-sucrose ester weight ratio at low initial reactant concentration, giving rise to rod-like and fibre-like 1D nanomaterials. Brushite nanorods and nanofibres with average diameters of 25.53 ± 4.60 nm (aspect ratio ~ 6) and 76.18 ± 19.74 nm (aspect ratio ~ 40), respectively, had been synthesized. As the reactant concentration increased, it became the key factor in controlling nucleation and crystal growth, rendering the aqueous-to-sucrose ester ratio unimportant. Formation mechanism of various morphologies of brushite crystals is postulated.

Keyword: Calcium phosphates; Brushite; Sucrose ester; Microemulsion; Low dimensional nanomaterials.