

Characterizations of biocompatible and bioactive hydroxyapatite particles

Abstract

The most common gene vectors used are virus based (viral gene vectors). These possess high immunological risk, so a non-viral gene vector maybe preferable. Nanocrystalline hydroxyapatite, HAp [$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$] is an example of a possible non-viral gene vector. This is due to its good biocompatibility, bioactivity and proven results as a non-viral gene vector. The HAp particles produced in this study was by the sol-gel method and the processing conditions were varied in terms of the processing temperatures (20 oC, 30 oC or 40 oC) and the stirring rates (200 rpm, 400 rpm or 600 rpm). The particles formed from all of the processing conditions were systematically characterized and compared to each other. The characterizations performed were FTIR, for identifying functional groups, XRD for phase composition, crystallinity and particle size estimation (by applying Scherrer's formula) and SEM for surface morphology. The characterizations data obtained showed that the functional groups, phase composition, crystallinity and surface morphology were similar for all of the samples, the only difference being on the calculated particle size. It also showed that, at a lower processing temperature and higher stirring rate, smaller particle sizes were formed.

Keywords

Hydroxyapatite; Particle characterizations; XRD