

Synthesis and Structural characterization of hydroxyapatite nanorods: Antibacterial activity and dermal irritation

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SUBJECT AREAS

Materials Chemistry *Materials Engineering*

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hydroxyapatite, Nano-rods, antibacterial activity

Abstract

Hydroxyapatite (HA) nanoparticles with homogeneous rod morphology were successfully synthesized by the hydrothermal method. The use of cationic and anionic surfactants (cetyltrimethylammonium bromide, CTAB, and sodium dodecyl sulfate, SDS) does not change the morphology, but the length/diameter ratio of HA nanorods did. The structural characterizations revealed well-crystallized samples in the hexagonal phase. The HA samples with a smaller Ca/P ratio presented larger crystalline size. The CTAB- sample present antibacterial activity against *Pseudomonas aeruginosa*, *Escherichia coli*, *Streptococcus anginosus*, *Staphylococcus aureus*, *Micrococcus luteus*, and *Klebsiella pneumoniae* suggesting that the bacteria nature and surface charge of nanoparticles affect the susceptibility.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

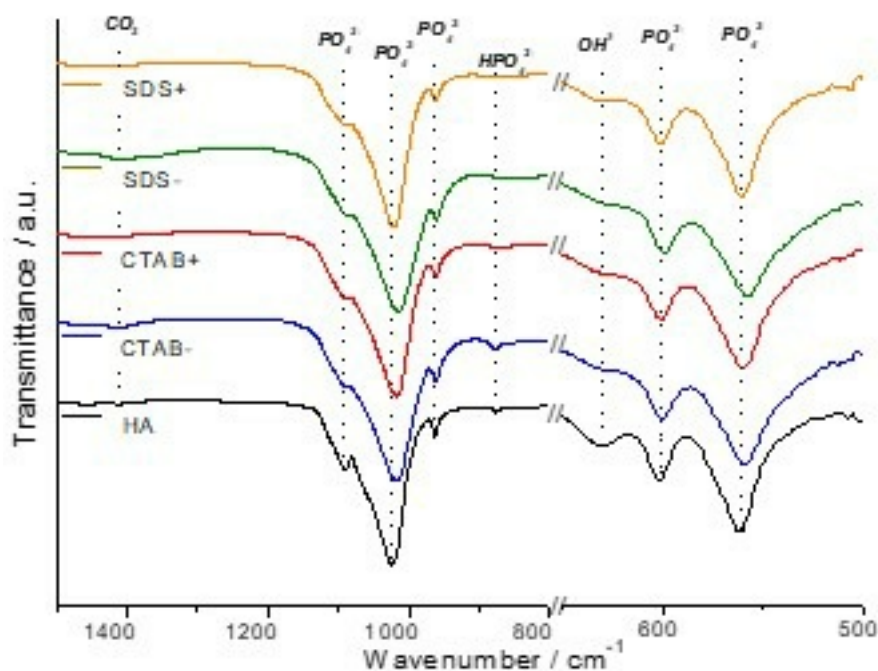


Figure 1

ATR-FTIR spectra of HA, CTAB-, CTAB+, SDS- and SDS+ samples.

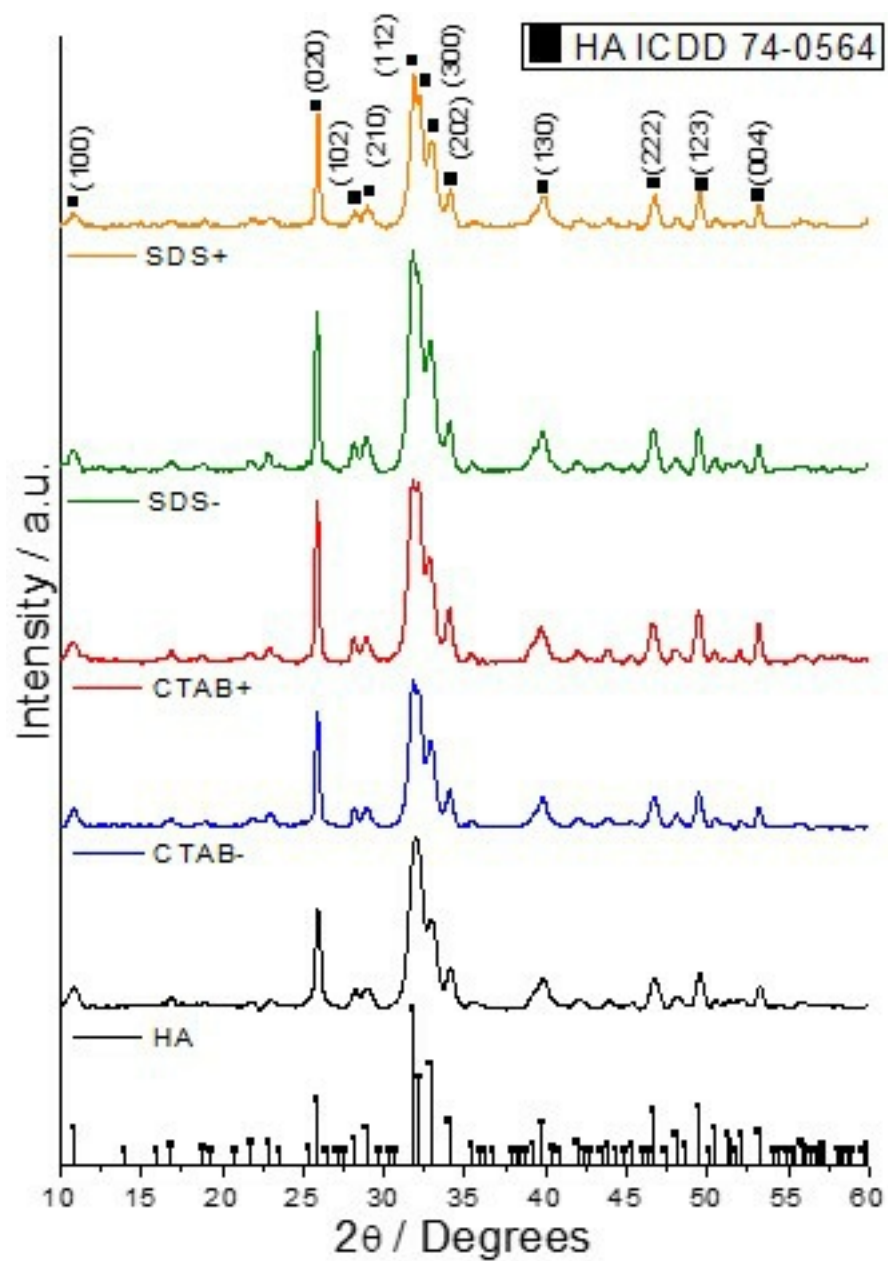


Figure 2

XRD patterns HA powders synthesized using surfactant.

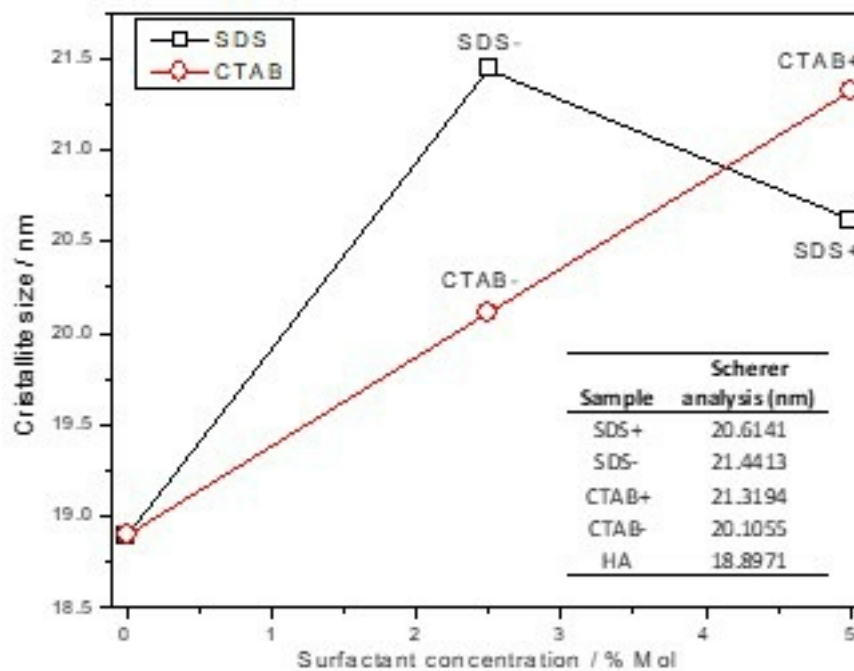
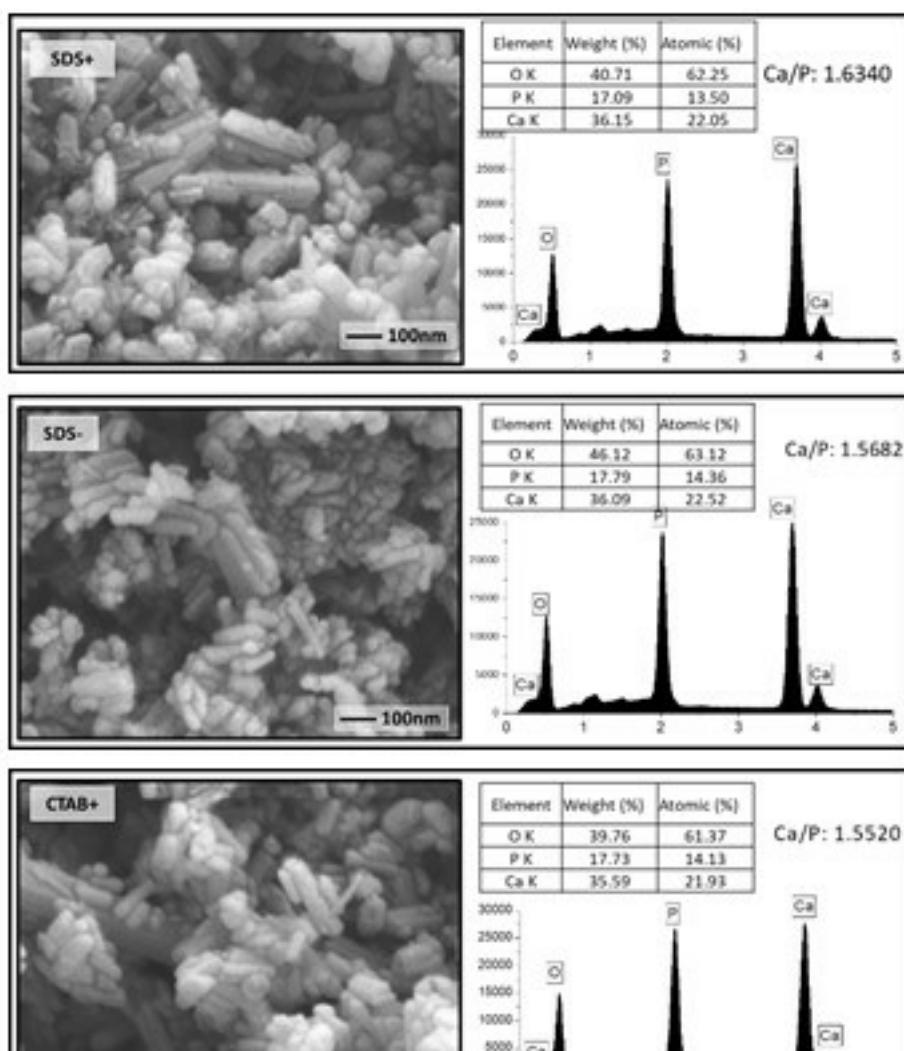


Figure 3

Apparent crystallite sizes of HA samples.



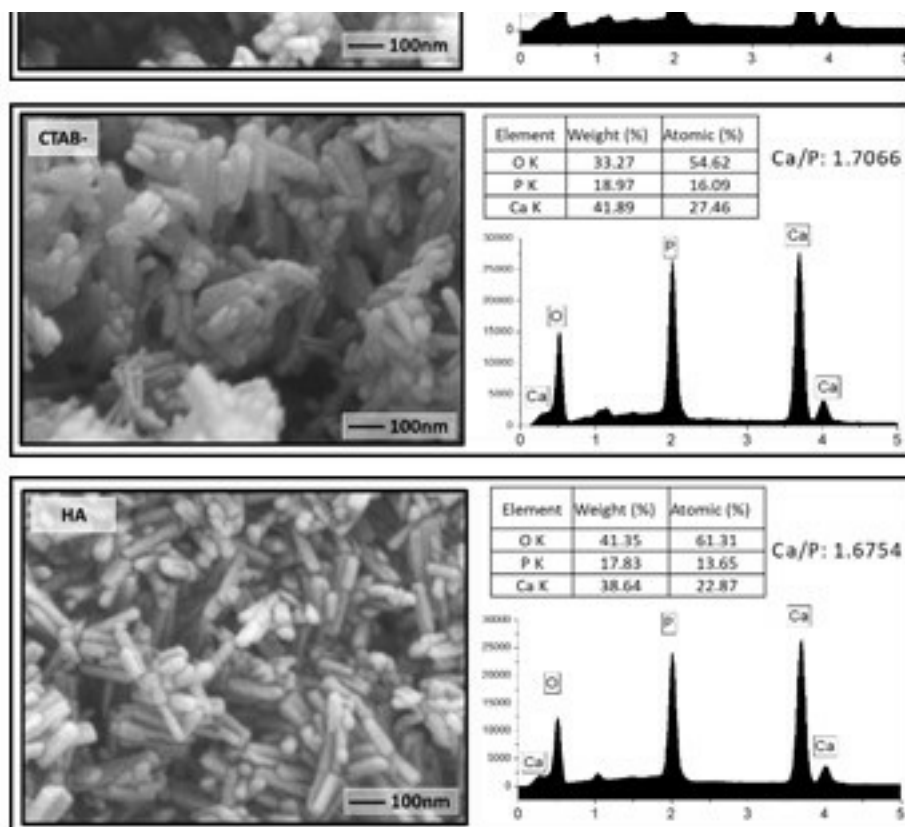


Figure 4

SEM micrographs of HA, CTAB-, SDS-, CTAB+, SDS+ powders.

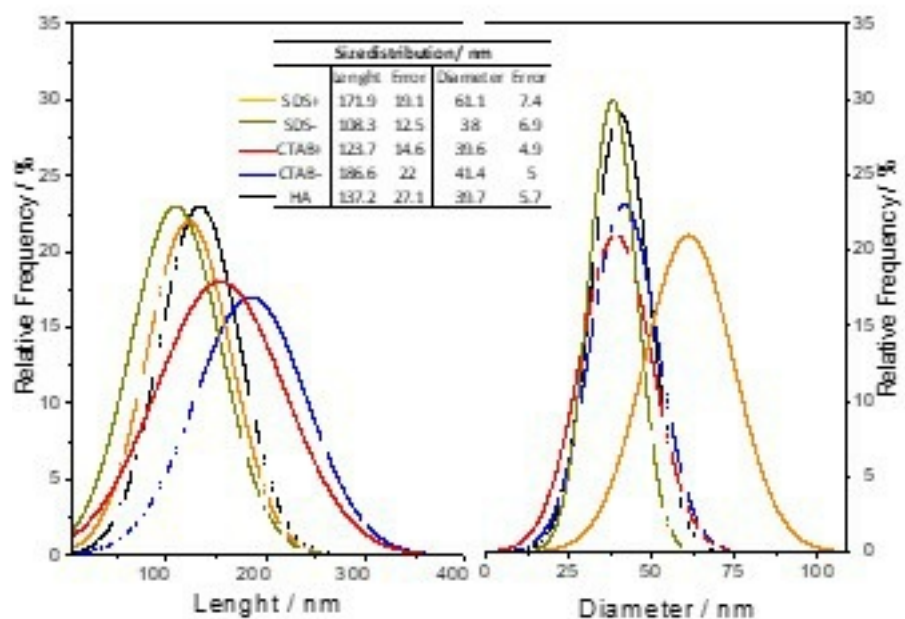


Figure 5

Size distribution diameter and length of HA samples

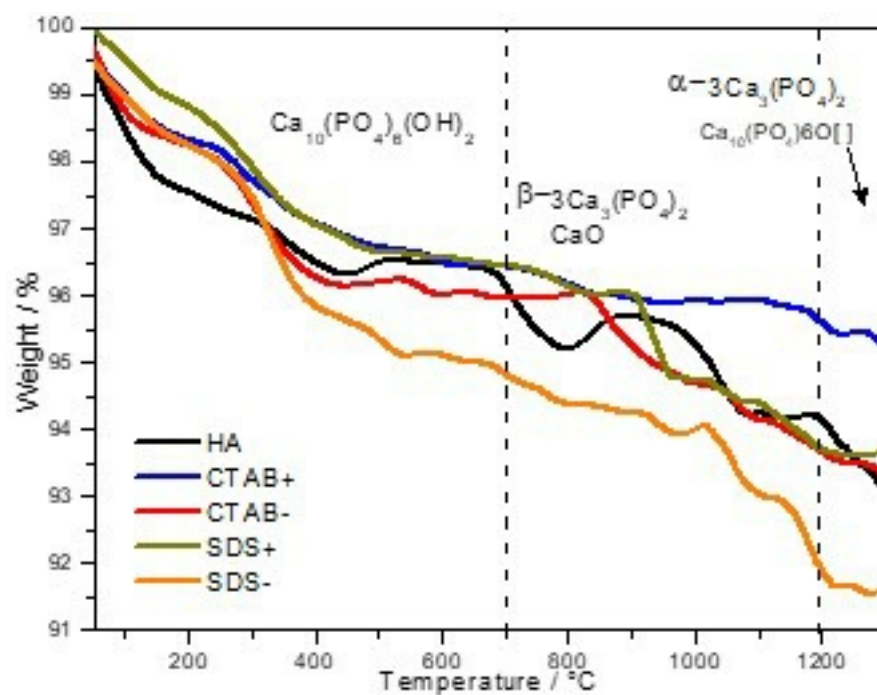


Figure 6

Thermogravimetric (TGA) of HA powders

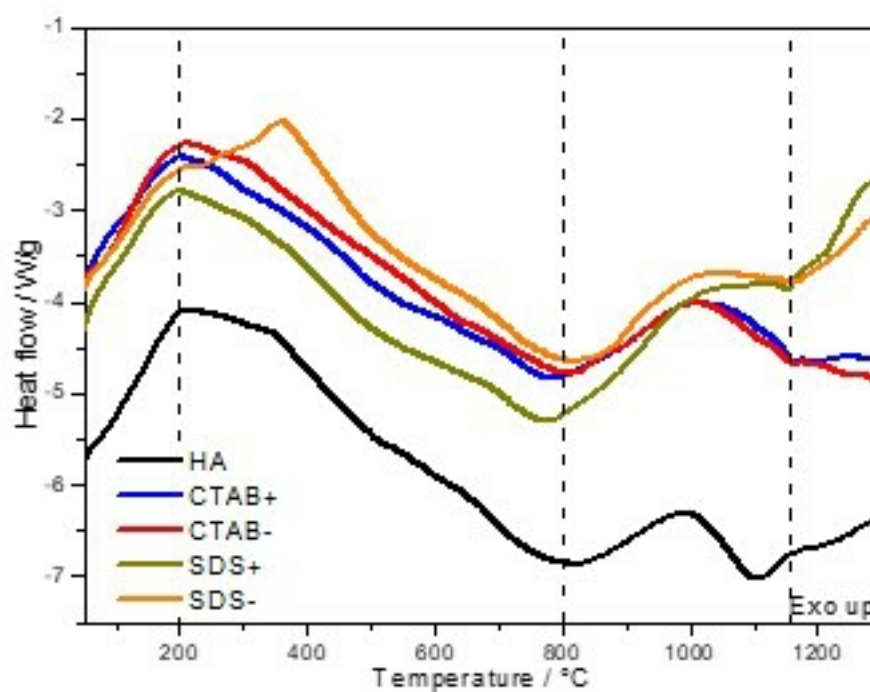


Figure 7

DTA curve of HA powders

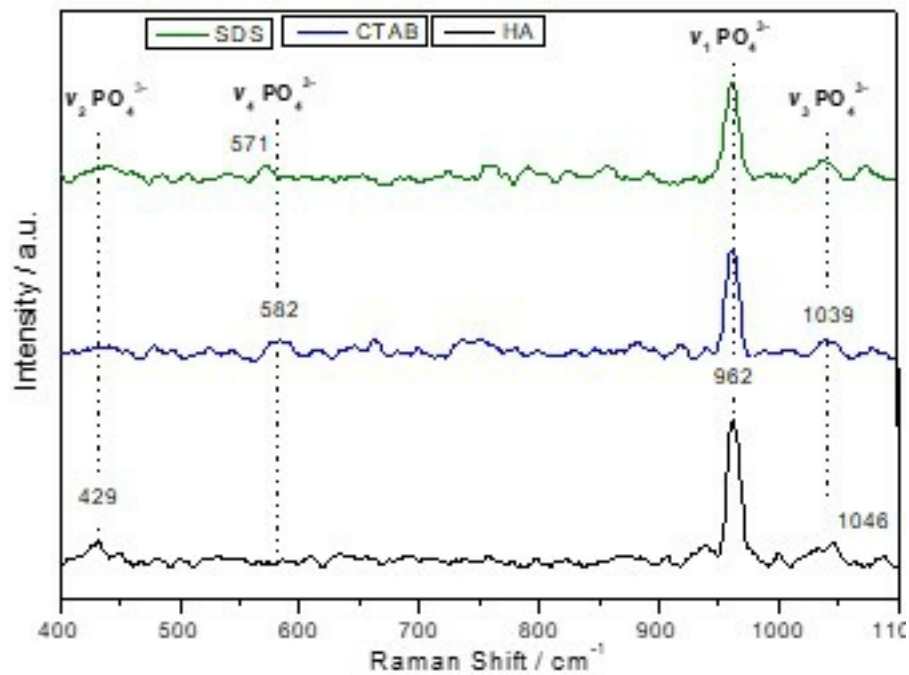


Figure 8

Raman spectra of HA powders.

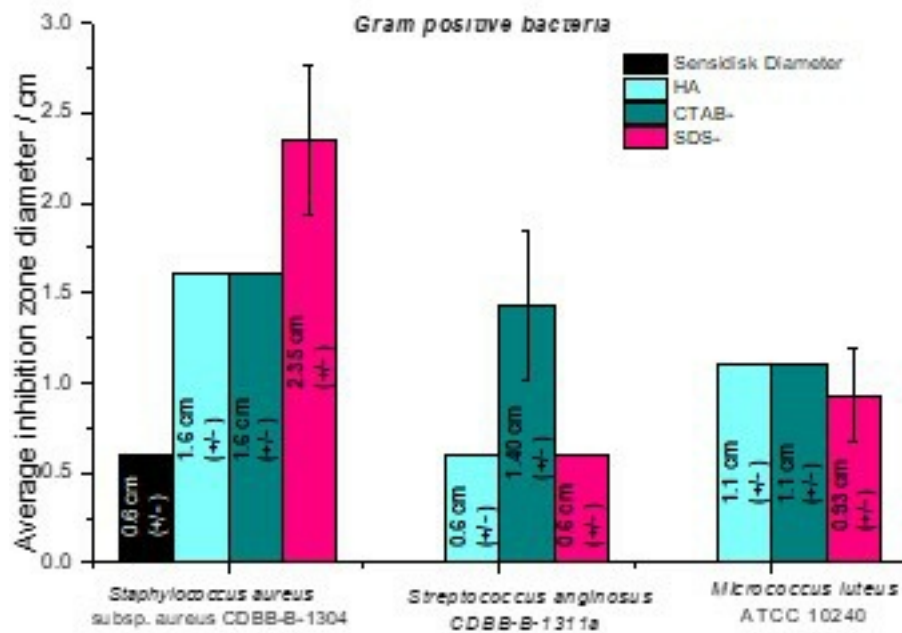


Figure 9

Inhibition zone diameter of HA powders a) Gram-positive and b) Gram-negative.