

- **Nanocomposites and nanomaterials**

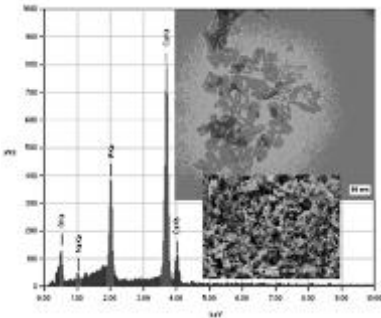
## **Hydroxyapatite / chitosan nanoparticles for dental application**

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Some recent studies have indicated that hydrogels, especially those derived from natural proteins and polysaccharide, are ideal scaffolds for tissue engineering because of their hydrophilicity and other unique properties, such as biocompatibility, biodegradability [1]. Nano-composite materials based on chitosan (CS) are very promising for tissue engineering because they maintain the bioactivity of CS, osteoconductivity of hydroxyapatite (HA) [2] and the injectability of hydrogel. The in vitro bioactivity of HA/CS hydrogel obtained by in situ biomimetic co-precipitation of HA and CS was assessed by soaking in SBF. Nano-HA crystals and morphology of the HA/CS hydrogel are presented in Fig. 1.



The prepared nano-HA is needle-like with size nearly 20-30 nm in vertical diameter and about 5 nm in horizontal diameter which is suitable for bone tissue engineering. FTIR investigation illustrated intermolecular interaction between CS and HA nanoparticles.

Treatment of the obtained HA/CS hydrogel with 0.3% solution of chlorhexidine digluconate and following centrifugation could be used for decreasing of gingival inflammation in dental application.

Fig. 1 SEM and TEM investigation of morphology of the hydroxyapatite/chitosan hydrogel.

1. *Drury J.L., Mooney D.J.* Hydrogels for tissue engineering: scaffold design variables and applications // *Biomaterials.* – 2003. - **24**, P. 4337-4351.
2. *Sukhodub L.F., Yanovska G.O., Sukhodub L.B., Kuznetsov V.M., Stanislavov O.S.* Nanocomposite apatite-biopolymer materials and coatings for biomedical applications // *J. Nano-Electr.Physics.* – 2014.- **6**, №1, 01001 (16 pp).