

## **The Effect of Polyelectrolytes on Nano Hydroxyapatite Crystal Growth**

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The precipitation and dissolution of calcium phosphate salts is of particular interest because of its importance in industrial water systems, in waste water treatment processes, in agriculture as fertilizers and in biological calcification processes [1]. Under physiological conditions the most stable calcium phosphate is hydroxyapatite ( $\text{Ca}_5(\text{PO}_4)_3\text{OH}$ , HAP). The growth mechanism of HAP has received considerable attention in view of its importance in understanding the mechanism of hard tissue calcification such as bone and teeth and in many undesirable cases of pathological mineralization of articular cartilage, dental caries and kidney stones [2].

In this work that we investigate the individual effect of polymeric additives for the hydroxyapatite (HAP) crystallization as a model for biomineralization. The higher affinity of PAA for HAP corresponds to the more significant effect of this polymer on the rate of HAP crystal growth.

The results indicate that polyelectrolyte concentration and the larger number of negatively charged functional groups markedly affect the growth rate. The fit of the Langmuir adsorption model to the experimental data supports a mechanism of inhibition through molecular adsorption of polymers on the surface of growing crystals.

[1] Amjad Z., *J. Colloid and Interface Science*, 1987, **117**, 98. [2] Koutsopoulos S., Dalas E., *J. Crystal Growth*, 2000, **217**, 410.

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