

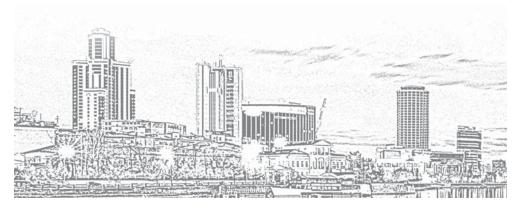


## **VOLUME 2b**

# CHEMISTRY AND TECHNOLOGY OF MATERIALS AND NANOMATERIALS

ABSTRACT BOOK in 5 volumes

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 $Volume\ 2b\ includes\ poster\ and\ correspondent\ presentations\ of\ the\ section:\ \text{``Chemistry\ and\ technology}\ of\ materials\ and\ nanomaterials\ ``.$ 

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## THE SYNTHESIS OF CALCIUM PHOSPHATES POWDERS FROM CALCIUM SALTS OF CARBOXYLIC ACIDS

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Porous materials with a specified geometry of the pore space can be fabricated using 3D stereolithographic printing from the suspension of fine inorganic powder in the mixture of monomers. Polymerization of monomers takes place under the action of ultraviolet radiation. To increase the print resolution of the 3D stereolithographic printing the dye is added in the composition of such suspensions. The resolution is significantly enhanced by the use of carbon as a colorant.

In this work it was proposed to give a color to the white powders of synthetic calcium phosphates (CP) by means of conducting of heat treatment of the powders at 500-800oC for carbonization of adsorbed reaction by-product (ARB). ARB, which was able to carbonizate, was formed during the synthesis of CP from calcium salts of carboxylic acids (formiate, acetate, lactate, malates, citrate, sacharetes) and various ammonium phosphates or phosphoric acids.



**Figure 1.** Ca  $_2P_2O_7$  powders synthesized from Ca(CH $_3$ COO) $_2$  and (NH $_4$ ) $_4P_2O_{7}$ , after heat treatment at different temperatures.

Hydrated CP with the ratio of Ca/P in the range of 0,5-1,67: Ca(PO<sub>3</sub>)<sub>2</sub>xH<sub>2</sub>O (Ca/P=0,5), CaHPO<sub>4</sub>·2H<sub>2</sub>O (Ca/P=1), Ca<sub>2</sub>P<sub>2</sub>O<sub>7</sub>xH<sub>2</sub>O (Ca/P=1), Ca<sub>8</sub>(HPO<sub>4</sub>)<sub>2</sub>(PO<sub>4</sub>)<sub>4</sub>·5H<sub>2</sub>O (Ca/P=1,33), Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>xH<sub>2</sub>O (Ca/P=1,5), Ca<sub>10</sub>(PO<sub>4</sub>)<sub>6</sub>(OH)<sub>2</sub> (Ca/P=1,67), and the double phosphate of calcium/ammonium (for example, Ca(NH<sub>4</sub>)<sub>4</sub>H(P<sub>2</sub>O<sub>7</sub>)<sub>2</sub> (Ca/P=0,25), Ca(NH<sub>4</sub>)<sub>2</sub>(HPO<sub>4</sub>)<sub>2</sub>·H<sub>2</sub>O (Ca/P=0,5) or Ca<sub>3</sub>(NH<sub>4</sub>)<sub>2</sub>(P<sub>2</sub>O<sub>7</sub>)<sub>2</sub>·6H<sub>2</sub>O (Ca/P=0,75) were obtained. In some cases, the powders after the synthesis were a mixture of 2 or 3 of listed products. In some cases, the powders after the synthesis were a mixture of 2-3 of listed products. But the phase composition of ceramics produced from the colored powders, after firing in the range 900-1200°C, corresponded to the ratio of Ca/P B in the desired interval (0,5-1,67).

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