

Double polymer networks as templates for *in situ* crystallization of calcium phosphates

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Double networks (DN) are a specific type of interpenetrating polymer networks (IPN) which hydrogels have very good mechanical performance¹. They differ from the common IPN in two characteristics: (i) there is a very big difference in the crosslinking density of both polymer networks and (ii) the weakly crosslinked polymer network should be in excess of the highly crosslinked one. Their peculiarly good mechanical performance could be explained by two factors: (i) the phase-separated morphology where the size of the domains is in the nanometer range² and (ii) the formation of covalent bonds between both polymer networks³.

In the present study we aim to explore the specific DN nanostructure in order to induce *in situ* controlled crystallization of calcium phosphates in their hydrogels. To this purpose we have synthesized and characterized DNs with different composition, namely poly(2-acrylamido-2-methyl-1-propanesulfonic acid) (PAMPS)/polyacrylamide (PAAm) and PAMPS/poly(2-hydroxyethylmethacrylate (PHEMA). DNs were used as templates for *in situ* calcium phosphates crystallization. The obtained hybrid inorganic-organic materials were characterized by infrared spectroscopy and X-ray diffraction. The morphology of the mineralized DNs was studied by scanning electron microscopy.

This work was financially supported by the Bulgarian Ministry of Education, Youth and Science under Project "BONEIMPLANTS" DTK 02-70/2009.

¹ J. P. Gong, Y. Katsuyama, T. Kurokawa and Y. Osada, *Adv. Mater.* **15**, 1155, 2003.

² G. Georgiev, K. Dyankova, E. Vassileva and K. Friedrich *e-polymers* **054**, 2006

³ P. S. Shestakova, R. Willem and E. Vassileva *Chem. Eur. J.* **17**, 14867-14877, 2011.