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## *Structural and Morphogenetic Complexity of Fluorapatite-Gelatine Nanocomposites*

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The most fascinating natural examples of nanocomposite materials are represented by so-called biominerals, acting as functional materials in living systems. In particular, apatite-organic (protein) nanocomposites are the main components of bone and teeth hard tissues of vertebrates (including humans) [1]. Biomimetic systems provide an excellent possibility to get deeper insight into the fundamental principles of structuring, organization and formation of biominerals. Therefore, our investigations are focused on biomimetic fluorapatite-gelatine nanocomposites grown by double-diffusion in gelatine gels [2]. In the gelatine gel protein molecules interact with the ions in solution in such a way that they provide nucleation positions for nano apatite and, in this way, give rise to dramatic processes of self-organization and hierarchical composite formation. Numerous experimental observations (by means of XRD, SEM, HRTEM, EH, etc.) together with atomistic computer simulations reveal the material to be best described as a mosaic-dominated nanocomposite superstructure. Furthermore intrinsic electric dipole fields, generated by a non-classical crystallization process of composite nanoboards, cause the integration of a meso/macroscopic pattern of gelatine microfibrils into the superstructure matrix and govern morphogenetic process of fluorapatite-gelatine nanocomposites [3].

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