

In this work several new self structured materials for polymeric substances could be synthesized. Furthermore, concepts for material development with natural archetype (biomineralization) have been emerged.

Therefore three appendages are used: First, the mineralization of blockcopolymermembranes, second the mineralization of blockcopolymer lattices and its capacity to control the morphology of crystals. Third the Hexamethoxymethylmelamine (HMMM) was investigated on its self condensation properties on the one hand (formation of planar nanoparticles), otherwise aqueous HMMM gels and dried HMMM structures were mineralized.

The first step was the mineralization of blockcopolymermembranes by the double diffusion technique. The membranes were totally filled with inorganic materials following by mechanical analysis of these hybrid materials. It could be shown that functional groups like  $-OH$ , or  $-COOH$  influence the crystal formation and on this way the mechanical properties

In the second step of this work it could be shown that DPE lattices are excellent to influence the morphology of crystals. Acrylic acid functionalized lattices form with calciumcarbonate or bariumsulphate organic/inorganic hybrid structures which are very interesting as pigments or fillers in polymeric materials.

The last part of this work occupied with the special properties of Hexamethoxymethylmelamine (HMMM). New planar nanoparticles with aspect ratios between 3 and 10 could be synthesized. In a further process, the nanoparticles form a highly structured, aqueous gel, with directed structures and consistent pore sizes. In mineralization experiments these gels form layered hybrid materials which are similar to structure of nacre.