

Seminar

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Nanophasic „Chameleon” Amphiphilic Conetworks as Hydrogels and Hydrophobic Gels in one Soft Material: From Novel Nanohybrids to Nanocatalysts, Antimicrobial Materials and Smart Drug Release Matrices

Amphiphilic polymer conetworks (APCNs) composed of covalently bonded otherwise immiscible hydrophilic and hydrophobic chains belong to a new group of rapidly emerging nanostructured materials (see e.g. refs. 1-7). Due to the covalent bonds between the immiscible macromolecular components, unique bicontinuous (cocontinuous) nanophase separated morphology exists in these materials in a broad composition window. Depending on the philicity of the surrounding, these unique materials behave as either hydrogels in protic (water) or hydrophobic gels in hydrophobic environments. This is the basis for the preparation of various specialty new APCN-based organic-inorganic nanohybrids of metal and metal oxides by applying one of the nanophases as nanoreactor. The synthesis principles, the adopting “chameleon” and stimuli responsive swelling behavior, the reinforcement effect of macromolecular cross-linkers, the bicontinuous nanostructural feature, the nanoreactor concept, novel APCN-based nanohybrids, cell attachment control, smart drug release, and antimicrobial properties of this class of unique soft materials will be presented and discussed.

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