

NANOSTRUCTURED, FUNCTIONAL COPOLYMERS AND THEIR POSSIBLE APPLICATIONS

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Block (ABA) and segmented (AB)_n copolymers display composition dependent nanostructures. Depending on the chemical structure, chain length, relative amounts of each block in the polymer backbone, method of sample preparation and thermal history, these materials show spherical, cylindrical, gyroidic or lamellar nanostructures. These well-defined polymers can be used as structural materials or templates for various nanotechnology related applications. Recently, we have developed novel, segmented, linear and hyperbranched polyurethane and polyurea type copolymers that can self-assemble into nanostructures. These materials were also modified through the addition of transition metal salts and their physicochemical and optoelectronic properties were investigated. Furthermore, highly elastic webs with fiber diameters in micro to nanometer range were also prepared from these linear and hyperbranched copolymers by electrospinning. Detailed investigations for the possible use of these materials in applications such as biomaterials, optoelectronic devices, permselective membranes, sensors and other supramolecular nanoscale assemblies are continuing.