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Smart shape-controlled synthesis of poly(N-Isopropylacrylamide)/chitosan/Fe₃O₄ microgels

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ABSTRACT

A novel approach was developed to synthesize smart shape-controlled PNIPAM/CS/Fe₃O₄ microgels with uniform size. Interestingly, the microgels in spindle-shaped, cuboid and spherical morphologies were successfully prepared using the micro-emulsion polymerization at a low temperature from 28 to 40 °C based on the theory of “coil-to-globule”. The morphology and properties of the as-prepared products were investigated using scanning electron microscope (SEM), dynamic light scattering (DLS) and superconducting quantum interference device (SQUID). Results revealed that the PNIPAM/CS/Fe₃O₄ microgels exhibited good thermo- and pH- sensitivities, and the size of the microgels decreased sharply upon increasing the temperature around 32 °C. The microgels with various shapes show a great promise in bioseparation and many other fields in the future.

Keywords: smart shape-controlled; PNIPAM/CS/Fe₃O₄ microgels; coil-to-globule; spindle-shaped; spherical

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