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**Phase Transitions in Superparamagnetic Polymer Brush Particles** ANNETTE SCHMIDT, Heinrich Heine-Universität Duesseldorf, ANDREAS KAISER, Heinrich Heine-Universität Duesseldorf — Nanostructured inorganic / organic hybrid materials play an outstanding role in modern technology. We present results on the synthesis and characterization of novel thermo- and magneto-responsive polymer brush coated particles. The investigated system is composed of nanocrystalline magnetite ( $\text{Fe}_3\text{O}_4$ ) as an inorganic core and a covalently anchored polystyrene (PS) shell. In cyclohexane, a thermoresponsive magnetic fluid is obtained due to a critical solution behaviour of the PS arms. Beside the phase transition of  $\text{Fe}_3\text{O}_4$ @PS particles, the well known coil-to-globule transition of  $\text{Fe}_3\text{O}_4$ @PS particles in cyclohexane is investigated. Both phenomena are compared to the behaviour of linear polymeric arms. The presented results show that magnetic brush particles are well-suited as a model system for the investigation of temperature transitions of surface-attached polymers.

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