

Polystyrene-modified magnetic nanoparticles as Pickering stabilizers

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We present here the preparation of switchable water-in-oil (W/O) and oil-in-water (O/W) Pickering emulsions with a polar solvent (as oil phase) only stabilized by polystyrene-modified magnetic nanoparticles. Initially, the ability to form Pickering emulsions of bare magnetic nanoparticles was evaluated concluding that they were not able to form W/O Pickering emulsions. For this reason, a new coating methodology based on the radical polymerization of a hydrophobic polymer (polystyrene) on the nanoparticle surface have been developed in order to modify the wettability of the bare magnetic nanoparticles. In this way, stable W/O and O/W Pickering emulsions were achieved being possible to continuously switch from one to other by changing the water/oil phase ratio. All variables related to the formation and stability of the Pickering emulsions were also studied and optimized. It should be noted the high stability in terms of temperature, pH and ionic strength as well as the easy and reproducible preparation of these emulsions.