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Ferrofluid stabilization in 1,2-propanol

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CoFe₂O₄ nanocrystals exhibit interesting physical properties for electronics and telecommunications, such as a high saturation magnetization and a very efficient Faraday rotation.¹ Within the last decade different chemical processes for the synthesis of CoFe₂O₄ nanoparticles have been developed. Among them, the co-precipitation method has shown to be particularly interesting due to its simplicity, high yield and the quality of the material obtained (homogeneous size distribution and high crystallinity).² Even though high colloidal stability of such ferrofluid is obtained in water or in an apolar aprotic organic solvents,³ aggregation occurs in alcoholic medium. In this manner, the magneto-optical properties of the ensemble are affected and its integration into other materials becomes limited. The present work consists in the functionalization of magnetic CoFe₂O₄ nanoparticles to improve their colloidal stability in alcoholic medium by using electrostatic or steric repulsion. In addition, a complete study on the interaction between the surfactants and the surface of the nanoparticles are presented.

Biography

Alexandra Madeira has completed her PhD from the University of Waterloo (Canada) and from the university of Bordeaux (France) in 2018. She studied the synthesis of silver nanowires and their use in optoelectronic application. In the frame of the CNRS project "Photomagnet", she is currently working on the synthesis and functionalization of magnetic nanoparticles at Sorbonne Université in Paris.

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