

Title: **New strategies to stabilize in water SPIONs and bismuth sulfide NPs for imaging diagnosis.**

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There is no better cancer therapy than an early detection state. X-ray computerized tomography (CT) and Magnetic Resonance Imaging (MRI) are the most powerful medical imaging techniques. Typically, these techniques require the use of contrast agents to enhance the image contrast in less time and thus to facilitate a fast diagnosis.

Current commercial agents based on small molecules, show a short circulation time and require high doses to provide better image contrast. On the other hand, the use of nanoparticles (NPs) with biocompatible enclosures presents an improvement of the properties, such as better circulation times and a less toxicity within the patient due to less amount of contrast agent would be needed.

In this framework, we show the preparation of superparamagnetic iron oxide NPs (SPIONs) and bismuth sulphide NPs encapsulated in a silica shell. First, we use chemical approaches to prepare both materials. Then, we gain further into the effect of reaction conditions on the particle morphology for bismuth sulphide NPs using LaMer and Ostwald ripening approaches. Finally, we do a preliminary study focusing on the NP silica encapsulation by the microemulsion method.

Keywords: SPIONs, bismuth sulphide NPs, silica encapsulation, Magnetic Resonance Imaging and X-ray computerized tomography.