



Smartphone-based colorimetric method to quantify iron concentration and to determine the nanoparticle size from magnetic nanoparticles suspensions

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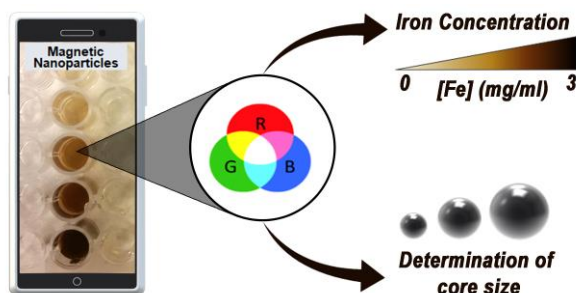
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The development of a fast, low cost and simple method to estimate the iron concentration and particle size of magnetic nanoparticle suspensions, using a colorimetric method based on images taken with a smartphone, has been carried out.

The analysis of a series of dilutions of wide library of magnetic nanoparticles, composed of iron oxide materials in the range between 3 and 43 nm, with two different shapes and four different coatings has led to interesting correlations between the color of the nanoparticle suspensions, their iron concentration, and the nanoparticles average size.

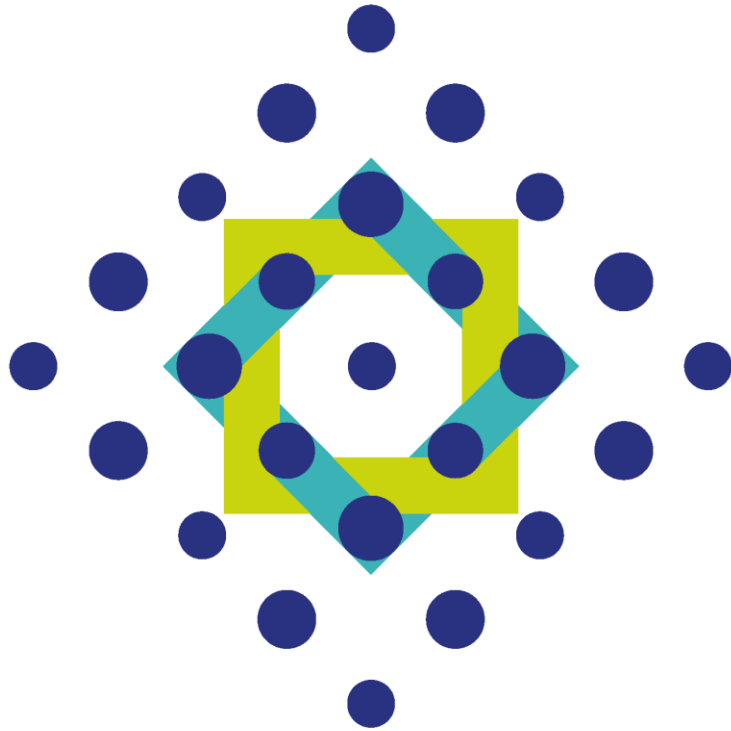
Two new uses of the color of these suspensions are proposed. The first one is the determination of the iron concentration from the suspensions' color. This is a relatively direct approach similar to other proposed methods for the quantification of different analytes. The second use is a novel, and not so straightforward approach, to determine the nanoparticles size from the suspensions' color. More specifically, a linear relationship between the color (in particular the G/R ratio) and the particles size has been found. This link between these two parameters allows the estimation of the nanoparticles size just by acquiring images from suspensions of iron oxide magnetic nanoparticles with a smartphone. In the future, this second approach will be used to estimate the particle size in magnetic nanoparticles degradation processes.





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