

Optical and thermal characterization of Fe_3O_4 nanoparticles covered with turmeric extract

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Superparamagnetic iron oxide nanoparticles (SPION's) have been used to develop biological applications such as hyperthermia therapy, diagnostic agent, and/or drug delivery [1]. Magnetite (Fe_3O_4) nanoparticles (MNP's) are considered as addressable magnetic target, which can be stimulated by an external AC magnetic field [2]. Moreover, for biomedical applications, the green synthesis route is highly recommended because it decreases the toxicity of nanoparticles and reduces toxic waste from synthesis [3]. In this work, magnetite nanoparticles covered with Curcuma extract were obtained by green synthesis. Also, these MNPs were optical and thermally characterized by using photothermal techniques, obtaining their optical absorption spectrum, thermal diffusivity, effusivity, conductivity, and heat capacity per volume unit.

Figure 1 shows the optical absorption spectrum of the synthesized MNP's, where it is possible to observe an absorption region from 300nm to 550nm.

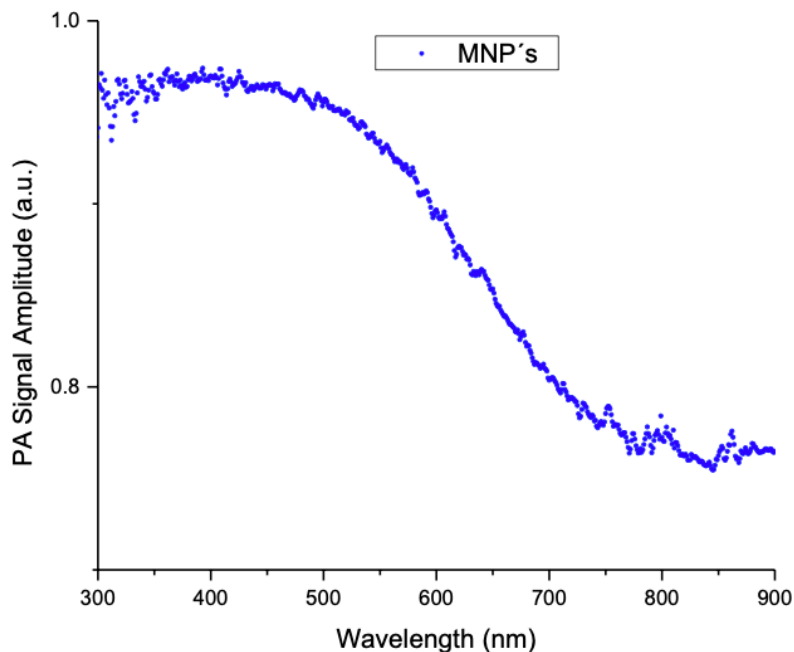


Fig. 1. Optical absorption spectrum of MNP's.



The thermal diffusivity and effusivity values of MNP's, were obtained by Thermal wave resonator cavity (TWRC) and inverse photopyroelectric (IPPE) photothermal techniques, respectively. The obtained thermal parameters are similar to the water thermal values due to the fact that MNP's were measured in water solutions [4].

References

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