

>Monitoring of the Photoacoustic Signal of Magnetite Decorated Carbon Nanotubes in Liquids Under an External Magnetic Field

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During the last years carbon nanotubes (CNT) have attracted great interest due to their outstanding electrical, magnetic, mechanical, thermal, and optical properties. CNT represent one of the most recently found allotropic forms of carbon having a high degree of constitutional organization. On the other hand, decorating CNT with magnetic particles has also attracted great attention due the possibility of manipulating the CNT using an external magnetic field. This characteristic makes them especially interesting due to its potential in changing the thermal properties of fluids in which decorated CNT are immerse. In this work the response of magnetic solutions, made of ethylene glycol as solvent and magnetite decorated CNT (m-CNT) as solute in different concentrations, were studied using the photoacoustic (PA) technique. The samples were mounted on a metallic surface in a modified Rosencwaig photoacoustic cell and the PA signal was registered as a function of time and at a fixed modulation frequency when the sample is subjected to an external magnetic field of 150 Gauss. The experiments show an increment in the PA signal, for the case of the magnetic field parallel to the laser beam and a decrease in PA signal for the case of the magnetic field perpendicular to the laser beam. It is shown that the observed phenomena can be understood using a two-layers model considering that the carbon nanotubes can be aligned along the external magnetic field forming a column-like structure.