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Influence of surfactant concentration on the absorption and emission of light in single-wall carbon nanotubes CRISTIANO FANTINI, Centro de Desenvolvimento da Tecnologia Nuclear — Optical absorption and photoluminescence have been largely used in the study and characterization of carbon nanotube samples, usually dispersed in aqueous solution wrapped with some surfactant. In this work we present a systematic investigation about the influence of the surfactant on the absorption and emission of light by carbon nanotubes. Carbon nanotubes dispersed in solution at different concentrations and wrapped with some different surfactant such as sodium dodecyl sulfate, sodium cholate, sodium dodecyl benzene-sulfonate and segments of DNA were used in the experiments. Optical absorption and photoluminescence spectra were measured and the effects of both the kind of surfactant and the nanotube and surfactant concentrations on the photoluminescence efficiency were investigated. By comparing the intensities of absorption and emission is possible to obtain the best nanotube and surfactant concentration for a higher efficiency in the emission of light. Changes in the absorption and emission energies are observed due to the environment screening on the exciton binding energies. Finally, we determine the structural assignment of the nanotubes and compare the dependence of the photoluminescence efficiency as a function of the surfactant and nanotube concentrations for different nanotube chiralities in the samples.

Cristiano Fantini
Centro de Desenvolvimento da Tecnologia Nuclear

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