SPECTROSCOPIC STUDY ON THE INTERCALATION OF LASER DYES IN THE NANOSTRUCTURED INTERLAYER SPACE OF CLAY THIN FILMS

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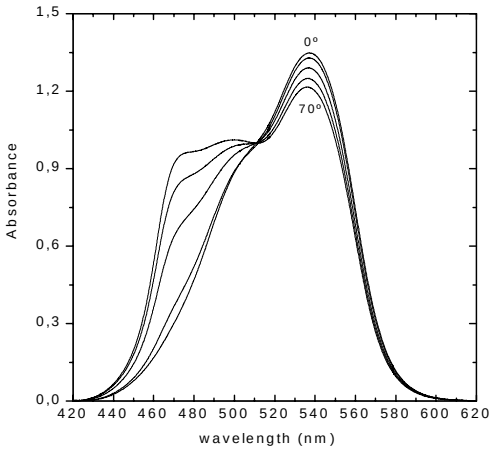
The lamellar structure of clay materials provide a bidimensional arrangement to adsorb organic compounds by a cation exchange mechanism. The stacking of clay layers in parallel planes gives rise to an interlayer space in the nano-scale range (10 – 20 nm), in which laser dyes can be intercalated with a preferential orientation. A macroscopic orientation of clay particles can be obtained in thin films of clay (thickness around 150 nm) by the spin-coating technique. The intercalation of cationic dyes in these films provides photoelectronic devices with interesting technological properties [1].

Rhodamime 6G (R6G) laser dye was incorporated in thin films of Laponite (Lap) clay. The evolution of the absorption and fluorescence spectra with the loading of R6G on Lap indicated the aggregation of the dye adsorbed on the clay surface. The orientation of the dye molecules can be determined by the photo-response of this material to the plane of the linearly polarized light [2]. The figure shows the evolution of the absorption spectra of the dye with respect to the angle of the polarized incident light and the normal to the films. These results suggest the preferential orientation of R6G adsorbed in Lap surfaces..

For low loadings samples, where the dye molecules are individually adsorbed as monomers, the angle between the long molecular axis of R6G and the normal to the Lap surface is around 61º. Lower angles (around 44º and 28º) are obtained for high loading samples, in which the dye can be adsorbed as dimers and high-order aggregates.



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[1] R.A. Schoonheydt et al., *Microporous Mesoporous Materials* **51** (2002), 91-138.

[2] N. Iyi et al , *Applied Clay Science* 22 (2002), 125-136.