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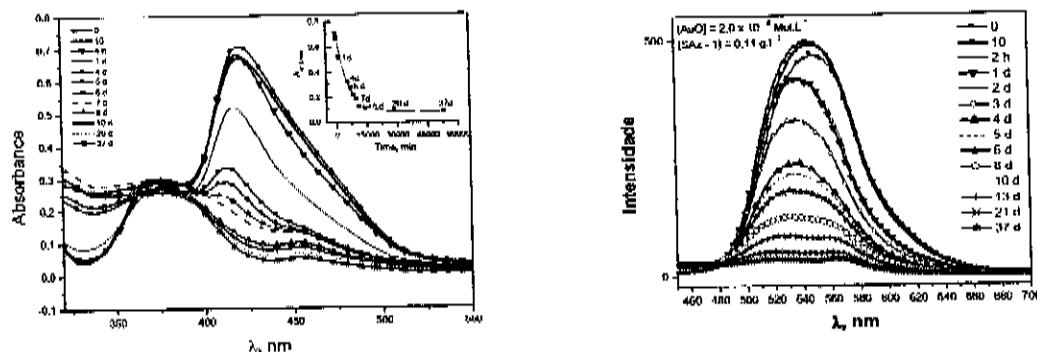
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Interaction of Auramine O with montmorillonite Clays

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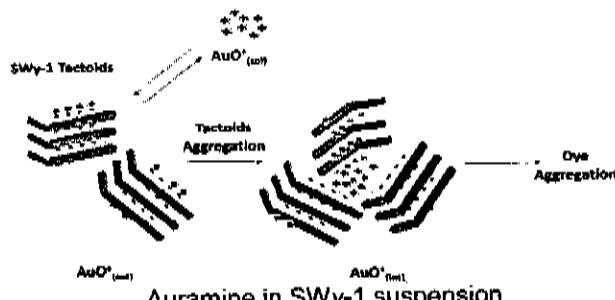
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Cationic dyes have been intercalated into clay interlayers and various chromatic changes based on the intercalation reactions have been revealed to be induced by the formation of aggregates through intermolecular interactions such as the static interaction with the clay surfaces or by protonation [1,2]. In this work, we report a spectroscopy study on the time evolution of the absorption of Auramine O by montmorillonite clays and emission properties of the dye in clay suspensions. The fluorescence of Auramine O increases immediately after mixing the dye solution with the suspension of clay due to its adsorption on the external surface of the clays, which restricts the torsional molecular motion of Auramine. At longer times, the dye molecules migrate into the interlamellar region of the clay particles. The aggregation of the dye molecules can be occurring in the interlayer region, leading to the decrease of the fluorescence emission.



Absorption and Emission spectra of Auramine O in SAz-1 clay suspension.

The clays with higher charge density, like SAz-1, show larger particle size that decreases the surface area available for adsorption. On the other hand, SWy-1, having a lower charge density, shows higher surface area available for adsorption of the dye. The dye adsorbed on external surface of SWy-1 induces the flocculation. The difference of the behavior in SAz-1 and SWy-1 can be traced to the higher ability of the latter to form clay aggregates. In the case of SWy-1, the AuO^+ aggregates are formed in the interparticle spaces of the clay clusters.



Auramine in SWy-1 suspension

The fluorescence quantum yields (Φ_F) of AuO on the natural montmorillonites SAz-1, SWy-1, Syn-1 and Laponite clays were 0.015, 0.007, 0.016 and 0.017, respectively. These values are higher than the Φ_F of AuO in aqueous solution and are of the same order of magnitude of the Φ_F found for viscous solvents such as n-hexanol and n-heptanol (0.014 and 0.015).

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References [1] K.Y. Jacobs, R.A. Schoonheydt, J. Colloid Interf. Sci. 220 (1999) 103

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