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Anisotropy of photoluminescence from dye molecules and zeolite-dye composites HYUNJIN LIM, HYEONSIK CHEONG, Dept. of Physics, Sogang Univ., JIN SEOK LEE, KYUNG BYUNG YOON, Dept. of Chemistry, Sogang Univ. — The dynamics of photoluminescence from dye molecules in solvents and dye-containing zeolite rods were studied using polarized photoluminescence spectroscopy. We used nanoporous zeolites and pyronine dyes as the host and guest materials, respectively. The effects of concentration of dye molecules and zeolite-dye composites in various solvent were studied systematically. The anisotropy value ($\sim$2.8) reached the theoretical value ($\sim$3.0) in a highly viscous solvent (glycerol), whereas the anisotropy value is $\sim$1 in a low viscosity solvent (DMSO). The PL peak also shows a blue-shift in strongly polar solvents. In the case of zeolite-dye composites, we obtained a lower anisotropy value ($\sim$2.2) in glycerol. This result is interpreted in terms of energy transfer from dye molecules inside the zeolite pores to dye molecules on the surface of zeolite crystals. We also prepared a more advanced system, dye-containing zeolite rods in uniform orientations, using pyronine B and Y and zeolite L. The polarized PL spectra from vertically oriented monolayer of zeolite rods containing dye molecules show that the anisotropy ratio is $\sim$9 when the polarization direction of excitation light and the c-axis of zeolite rods are parallel.

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