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Energy transfer of dye molecule-containing zeolite monolayer studied using polarized photoluminescence spectroscopy HYUNJIN LIM, HYEONSIK CHEONG, Sogang University, JIN SEOK LEE, Sookmyung Women's University, KYUNG BYUNG YOON, Sogang University — The inter- and intra-molecule energy transfers in dye molecules in zeolite crystals were studied using polarized photoluminescence spectroscopy. We used nanoporous zeolite L crystal and two kinds of dye molecules, pyronine B (PyB) and Y (PyY), as the host and guest materials, respectively. The dye- containing zeolite monolayer was vertically oriented to the substrate. From the depolarization ratio, we can confirm that the PyB are tightly confined and line up along the channel direction of the zeolite. On the other hand, PyY is smaller than PyB and can be positioned perpendicular to the channel direction of the zeolite. The luminescence of PyB embedded in zeolite pores was blue-shifted, but that of PyY embedded in zeolite pores was not changed compare to the dye molecules in solvent. When the polarization direction of the incident beam was perpendicular to the c-axis of zeolite monolayer, a red- shift relative to the parallel polarization case was observed. This result shows the energy transfer from intra-channel dye molecules to the dye molecules outside the pores. The depolarization ratio of the PyY-containing zeolite monolayer was lower than that of randomly dispersed PyY molecules in solvent. From this, we infer that there is an inter-molecule energy transfer inside the zeolite pores.

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