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TITLE

Enhanced stabilization of tris (8-hydroxyquinoline) aluminum(III) adsorbed in mesoporous silicas

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Mesoporous silicas prepared by supramolecular templating methods possess attractive features such as well-defined and controllable pore size, large surface area, and reactive surfaces for the guest organization. The possible effect of mesopore inclusion on the functions has been researched, and a wide variety of host–guest complexes has been suggested so far. Tris (8-hydroxyquinoline) aluminum (III) (Alq_3) has been studied widely as an organic light-emitting material; however, the effective control of the intermolecular interactions and stabilization has not been well-documented. In this study, the state and stabilization of the Alq_3 adsorbed in mesoporous silicas with different pore sizes (3.1 and 5.0 nm) were investigated. Alq_3 was successfully occluded into the mesoporous silicas from solution and the adsorbed amount of Alq_3 was effectively controlled by changing the added amount in the solution. The photoluminescence spectra of the Alq_3 in the mesoporous silicas clearly revealed that the molecular state in the mesopore varied depending on the pore size, indicating the mobility of the adsorbed Alq_3 on the pore. The thermal- and photo-stabilization also depended on the pore size and was higher as compared to that of neat Alq_3. Therefore, the guest-guest interactions between Alq_3 molecules as well as the host-guest interactions between Alq_3 and mesopores were different with the pore size. The molecular states controlled by the mesopore inclusion would affect the enhanced stabilization.

Biography

Motohiro Tagaya is an Assistant Professor at Department of Materials Science and Technology at Nagaoka University of Technology. He obtained B.S. degree from Waseda University. He received the M.D. and Ph.D. degrees from Tokyo Institute of Technology. He then worked as Japan Society for the Promotion of Science Research Fellowship. At the same time, he was in Visiting Research Scientist at Biomaterial Center of National Institute for Materials Science. His research purpose is to clarify the interfacial phenomena between the biomaterial surfaces and biomolecules. His recent interest is to develop biosensors and bio-imaging and bio-display nanomaterials.