Applied Surface Science
Volume 190, Issues 1-4 , 8 May 2002, Pages 382-385

doi:10.1016/S0169-4332(01)00896-0 Cite or Link Using DOI

Vibration spectroscopic study of the interaction of tris-(8-hydroxyquinoline) aluminum (Alq_3) with potassium

Y. Sakurai[a], G. Salvan[b], Y. Hosoi[a], H. Ishii[a], Y. Ouchi[a], K. Seki[c], T. U. Kampen[b] and D. R. T. Zahn[b]

[a] Department of Chemistry, Graduate School of Science, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8602, Japan
[b] Institut für Physik, Technische Universität Chemnitz, D-09107 Chemnitz, Germany
[c] Research Center for Materials Science, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8602, Japan

Available online 6 December 2001.

Abstract

The interaction between Alq_3 and potassium was studied by using Raman and infrared spectroscopies. Infrared reflection absorption spectroscopy (IRRAS) spectra of Alq_3 films show significant changes after potassium deposition, such as the appearance of new bands and changes in relative intensity. Surface-enhanced Raman scattering (SERS) spectra obtained using the 413.1 nm line of a Kr^+ laser reveal similar changes. Changes are even more obvious when the 530.9 nm line was used for excitation. Changes in the SERS for excitation with the 413.1 nm line are less obvious due to a strong photoluminescence. The vibrational pattern of potassium-doped Alq_3 cannot be explained by the formation of radical anion by simple charge transfer, indicating the excess electron is not delocalized over the molecule. The observed spectral change suggests that the potassium atom interacts with both nitrogen and oxygen atoms of Alq_3 molecule.

Author Keywords: Tris-(8-hydroxyquinoline) aluminum (Alq_3); Potassium; Raman spectroscopy; Infrared reflection absorption spectroscopy

Corresponding author. Fax: +81-52-789-2944; email: sakurai@mat.chem.nagoya-u.ac.jp