

Abstract Submitted
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Methylamine Intercalation Rates in Lead Iodide¹ M. GALLEGOS², B. MAGNESS, W. TIKKANEN, H. GOLDWHITE, T. BERHE, C. C. COLEMAN, CSULA — The intercalation and deintercalation rates and some optical spectral changes of methylamine guests intercalated into layer structured lead iodide hosts are reported. Vapor diffused purified lead iodide was used to make powder, thick film and thin film samples. Host films of 200 to 500nm were evaporated on quartz crystals. Degassed host samples were exposed to guest gas pressures ranging from 5 to 200 Torr in an isolated glass system. Mass changes were determined by quartz spring and crystal frequency change methods. The final intercalation of methylamine into lead iodide at low guest pressures reaches saturation in 3 hours. This results in an uptake of 1.3:1 mole ratio of guest to host. However, a plateau in uptake occurs at a 0.64:1 guest to host mole ratio within ten seconds of exposure depending upon the pressure of the guest. Deintercalation obtained by pumping takes 15 days suggesting the intercalated state is fairly stable. There are indications of a plateau in the deintercalation data at the 0.64:1 mole ratio as well further suggesting the possibility of a second stage in this system. Optical data were obtained using thin film host samples, which produced a 0.46 eV increase of the optical band edge energy upon intercalation.

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