

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Mixing in a Solid Monolayer: $\text{SF}_6 + \text{C}_2\text{F}_6$ on Graphite¹ G. B. HESS, Univ. of Virginia, B. L. ELLIS, YIZE LI — We have studied mixing of SF_6 and C_2F_6 in a solid monolayer film on graphite by admitting one gas to the cell to a pressure between monolayer condensation and saturation, then slowly admitting the other gas. The total coverage is monitored by ellipsometry and the condition of the individual adsorbates is determined by infrared absorption spectra. In particular, shifts in absorption lines due to dynamic dipole coupling indicate the local environment of molecules of each species. At 75 and 80 K there is no detectable solubility of C_2F_6 in a dense SF_6 monolayer, then a layer of nearly pure C_2F_6 condenses on top. At 86 K there is limited solubility of C_2F_6 in dense SF_6 , followed by appearance of a second C_2F_6 -rich phase in the monolayer. At 90 K and above, C_2F_6 appears to replace SF_6 by continuous substitution; thus there appears to be a 2-D solid consolute critical point near 90 K. If SF_6 is added to a higher-temperature, low-density C_2F_6 layer, the C_2F_6 molecules are rapidly compressed from flat or tilted orientation to axes perpendicular to the substrate, then are continuously diluted.

¹Supported by NSF grant DMR0305194

G. B. Hess
Univ. of Virginia

Date submitted: 30 Nov 2005

Electronic form version 1.4