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Binary mixture study of CF_4 and CF_3Cl on graphite[1] PETROS THOMAS, DANIEL VELAZQUEZ, GEORGE HESS, University of Virginia — In a binary mixture adsorption study of CF_4 and CF_3Cl on graphite from 60 K to 105 K, both the CF_3Cl - ν_4 and the CF_4 - ν_3 frequency shifts are measured using IRAS as the spreading pressure (chemical potential) of CF_4 is increased. Even though CF_3Cl has a much lower saturation vapor pressure (SVP) compared to CF_4 (at 80 K, SVP of CF_4 is $\sim$ 70 mT and that of CF_3Cl is $\sim$ 0.1 mT), the CF_4 either continuously displaces or adsorbs on top of CF_3Cl depending on the initial coverage of CF_3Cl on the graphite surface. For temperatures between 70 K and 105 K and lower coverage of CF_3Cl, where the molecules lie with their C – Cl axis nearly parallel with the surface, CF_4 continuously displaces CF_3Cl from the surface. For saturated monolayer coverage of CF_3Cl, where the C – Cl axis of the molecules are tilted relative to the surface, the CF_4 molecules adsorb on top of the CF_3Cl – HOPG template. At 60 K, the displacement of the low-coverage CF_3Cl is only partial and the orientation of the remaining CF_3Cl is tilted relative to the surface from a nearly flat position.

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