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Characterization of CaF_2 surfaces using Adsorption-Desorption Isotherms and Atomic Force Microscopy L.R. WADLEIGH, D.R. LUHMAN, P.G. BUMCROT, Carleton College — We are interested in using rough CaF_2 films to study the superfluid transition in two-dimensional helium systems. These experiments require quantitative information regarding the topography of the CaF_2 surfaces. The surface roughness of CaF_2 films is known to increase with film thickness as has been shown with previous atomic force microscopy (AFM) measurements [1]. We have fabricated a series of CaF_2samples of different film thicknesses and thus different surface roughnesses. These surfaces were studied using AFM and adsorption-desorption isotherm measurements with liquid nitrogen at T=77 K. The isotherm measurements allow us to determine the pore size distribution of each CaF_2film thickness. We find the emergence of hysteretic capillary condensation due to deep pores in the CaF_2 as the film thickness increases. The development of these deep pores is also seen in our AFM measurements. Our combined results provide a detailed description of CaF_2 surface roughness which can be utilized in the planned superfluid experiment. [1] D.R. Luhman and R.B. Hallock, Phys Rev. E **70**, 051606 (2004).

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