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Dissociative and molecular adsorption and recombinative desorption of methylchlorosilanes at the Cu (001) surface J. LALLO, L.V. GONCHAROVA, A.V. ERMAKOV, B.J. HINCH, Dept. of Chemistry, Rutgers University, D. STRONGIN, Dept. of Chemistry, Temple University — The Direct Synthesis of dichlorodimethylsilane above Cu/Si containing surfaces, is central to the commercial manufacture of many silicone materials. The atomic scale mechanisms responsible for the high selectivity for dichlorodimethylsilane, vs. other chloromethylsilanes, is poorly understood. As part of a more extensive program we report here on the interactions of chloromethylsilanes with copper. Adsorption of dichlorodimethylsilane on Cu(001) is, at least in part, dissociative. Yet AES indicates non-stoichiometric surface concentrations of Cl and C. This observation, which is apparent in both low (140K) and room temperature exposures, is indicative of a facile recombinative desorption process. Subsequent TPD spectra also indicate the desorption of not only the parent adsorbate, but other species also. Indeed the combined cracking patterns, of simultaneously desorbing species, are inconsistent with solely $(CH_3)_xSiCl_y$ species. We report on the TPD, AES, and high-resolution helium atom scattering studies of (i) adsorption of methylchlorosilanes, and (ii) their coadsorption with added SiH_4, CH_3 and Cl species, on Cu(001). Evidence for methyl cracking, and disilane production will discussed.

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