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Amino Acid Immobilization of Surface Diffusion on Copper NATHAN GUISINGER, Argonne National Lab, ERIN ISKI, University of Tulsa, ANDREW MANNIX, BRIAN KIRALY, Northwestern University, BRANDON FISHER, Argonne National Lab, MARK HERSAM, Northwestern University — The 2D-scale study of relevant biomolecules, like amino acids, is pertinent for a variety of applications from the origin of biological homochirality and the amplification of surface chirality to the examination of noncovalent supramolecular interactions. The need for pristine molecular resolution of these systems requires the use of ultra-high vacuum scanning tunneling microscopy (UHV STM) as the primary technique for these studies. Through the detailed examination of the self-assembly behavior of five amino acid molecules on a Cu(111) single crystal, a fascinating and unexpected phenomena was discovered. All of the amino acids assisted in the immobilization of copper atoms on the surface. The energetic landscape of the surface as mediated by temperature and molecular coverage facilitated the growth of copper islands. The growth and size fluctuation of the islands offered an interesting snapshot of metal nanocluster diffusion that often occurs at time scales beyond the resolution of a given experimental technique. The presence of $\sim$ 1 ML of molecules on the surface effectively trapped the metal atoms into localized islands. Elevated temperatures ($\leq$ 350 K) were used to promote the further diffusion, coalescence, and extinction of the islands for a more detailed understanding of the coarsening and ripening mechanisms.

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