SOFT X-RAY SPECTROSCOPY OF GLYCYL-GLYCINE ADSORBED ON Cu(110) SURFACE

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Studies of the interaction between organic compounds and surfaces are motivated by their application as bio sensors, and their relevance to biocompatibility of implants and the origin of life. In the present work interaction of the simplest peptide, glycyl-glycine, with the Cu surface has been studied. Multilayer, monolayer and sub-monolayer films of this dipeptide on the clean and oxygen modified Cu(110) surface were prepared by thermal evaporation in high vacuum. The techniques used were soft X-ray photoelectron spectroscopy, near edge X-ray absorption fine structure spectroscopy and density functional theory calculations. By comparing the experimental and theoretical spectra, detailed models of the electronic structure and adsorption geometry for each coverage have been proposed, which are in good agreement with the theoretical calculations. The carboxylic acid group of glycyl-glycine loses hydrogen and the molecule is coordinated via the carboxylate oxygen atoms to the surface. At low coverage the amino group bonds to the surface via a hydrogen atom, while at higher coverage the bonding is via the nitrogen lone pair. The peptide group is not involved in the bonding to the surface.