

HYDROGEN-BONDED NANOSTRUCTURES OF Au₅₅ CLUSTERS ON A FUNCTIONALIZED SELF-ASSEMBLED MONOLAYER

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Using nanoparticles as building blocks to form large self-assembled and self-organized architectures is an important strategy in nanometer-size device fabrication. Here we present first results on how arrays of Au₅₅-clusters on a surface can be realized and studied by STM and XPS. A set of two complementary hydrogen-bonding ligands was used to induce specific adsorption by molecular recognition. One of the organic ligands was grafted to the surface of the Au₅₅-clusters, the other was incorporated into a self-assembled alkanethiol monolayer (SAM) on Au(111). Only when the two complementary ligands are present, one on the clusters and the other in the SAM, STM images show specific adsorption of the functionalized Au₅₅-clusters and no aggregation between Au₅₅-clusters. In the case of the presence of the same ligands on the Au₅₅-clusters and in the SAM or when ligands are present only on the clusters, no specific adsorption is observed.