

SURFACE-GRAFTED PARAMAGNETIC MACROCYCLIC COMPLEXES SEEN BY STM

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The development of molecular nanostructures which contain magnetically bistable transition metal complexes arranged on planar surfaces is an active route towards materials with controllable magnetic or spintronic properties, leading to potential applications on information storage at the molecular level and molecular spintronics. Here we study the molecular anchoring and electronic properties of macrocyclic complexes fixed on gold surfaces [1]. Exchange-coupled macrocyclic complexes $[\text{Ni}_2\text{L}(\text{Hmba})]^+$ were deposited ex-situ via 4-mercaptobenzoate ligands on the surface of a Au(111) single crystal from solution in dichloromethane. The combined results from STM and XPS show the formation of large monolayers anchored via Au-S bonds with a height of about 1.5 nm. Two apparent granular structures are visible: one related to the dinickel molecular complexes (cationic structures) and a second one related to the counter ions ClO_4^- which stabilize the monolayer. No type of short and long range order is observed. STM tip-interaction with the monolayer reveals higher degradation after eight hours of measurement. Spectroscopy measurements suggest a gap of about 2.5 eV between HOMO and LUMO of the cationic structures and smaller gap in the areas related to the anionic structures.

Paramagnetic Complexes: Self Assembled Monolayers; Scanning Tunneling Microscopy

References

[1] C. Salazar, J. Lach, F. Rückerl, D. Baumann, S. Schimmel, M. Knupfer, B. Kersting, B. Büchner, C. Hess, *Langmuir* 32 (2016) 4464.