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Rectification in Porphyrin/Fullerene Dyads on Au(111)* DOMINIC BRITTI, RAY PHANEUF, University of Maryland, FRANCESCA MATINO, VALENTINA ARIMA, MANUEL PIACENZA, FABIO DELLA SALA, GIUSEPPE MARUCCIO, NNL Lecce, Italy, ROBERTA DEL SOLE[1], GIUSEPPE MELE, GIUSEPPE VASAPOLLO, Universita del Salento, Italy, ROBERTO CINGOLANI, ROSS RINALDI, NNL Lecce, Italy — We present an ultrahigh vacuum scanning tunneling microscopy (UHV-STM) and scanning tunneling spectroscopy study of *ex-situ* self assembled supramolecular dyads, consisting of fulleropyrrolidines (PyC_2C_{60}) axially ligated to zinc(II) tetraphenylporphyrin (ZnTPP), self organized by axial ligation to a 4-aminothiophenol (4-ATP), self assembled monolayer on gold (111). By highly diluting the PyC_2C_{60} solution, and subsequently annealing in vacuum, isolated dyads are obtained; these show both bias polarity-dependent apparent height in STM images, and highly rectifying behaviour in tunneling spectroscopy. First principles density functional theory calculations clarify the conformational and the electronic properties of the 4-ATP/ZnTPP/PyC_2C_{60} system. The rectifying behavior is explained using a model based on the Aviram-Ratner mechanism. * Work supported by the CNR-INFM, by a NSF US-Italy Cooperative Research Program #OISE-0242579, by the SpiDME European project and by MIUR FIRB 2003 'SYNERGY' grant. Lab for Physical Sciences and in part by a NSF-MRSEC, DMR# 0520471.

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