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Adsorption geometry of ZnTPP molecules on Au(111): self-assembly and surface interaction CHARLES RUGGIERI, SYLVIE RANGAN, ROBERT BARTYNSKI, ELENA GALOPPINI, Rutgers Univ — The interaction between Zinc Tetraphenylporphyrin (ZnTPP) molecules and a Au(111) surface, from initial adsorption sites to monolayer organization, is investigated using scanning tunnel microscopy with a particular emphasis on registry of the overlayer and surface atomic structure. At low coverages ZnTPP decorates step edges. With further deposition, ZnTPP molecules form self-organized islands of flat-lying macrocycles having a well-defined registry with, and dimensions bounded by, the underlying Au(111) herringbone reconstruction. At monolayer coverage, the herringbone reconstruction persists, enabling the relationship between the geometry of the self-organized molecular layer and that of the Au(111) surface to be established. Surface annealing generates a more complex self-assembled structure characterized by Au step edges that strictly align with ZnTPP molecular rows. The underlying mechanisms for this behavior will be discussed.

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