Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Conductance in Vertically Aligned Zn Porphyrin Molecular Junctions KIM LEWIS, GUOGUANG QIAN, SWATILEKHA SAHA, Rensselaer Polytechnic Institute — Porphyrin molecules are a key platform for understanding molecular conductance. These molecules play an important role in biological processes, such as oxygen storage and transport, which researchers want to exploit for exotic applications, including multibit storage, memory elements, and photovoltaics. Recently, experiments investigated conductance in porphyrin molecules ligating a metal atom of zinc. In the current-voltage curves two steplike changes were identified for this molecule, which adopted a configuration parallel to the substrate. Here, we observe the existence of a two state conductance in vertically aligned tunnel junctions formed by porphyrin molecules ligating a zinc atom. Measurements are performed by forming single molecule junctions between a scanning tunneling microscope tip and a gold substrate. Peaks in the conductance histograms show molecules change from a high conducting state to a low conducting state. However, a similar effect is not observed for porphyrin molecules without a ligating atom. Possible origins for the observed phenomenon are discussed.

Kim Lewis
Rensselaer Polytechnic Institute

Date submitted: 20 Nov 2009 Electronic form version 1.4