Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Electronic Nano-Structures as Ionic Barriers: A New Corrosion Prevention Concept SREEYA SREEVATSA, Department of Applied Physics and the Electronic Imaging Center, HAIM GREBEL, Deaprtment of Electrical and Computer Engineering and the Electronic Imaging Center — Corrosion is a longstanding problem which costs the economy billions of dollars annually. The simplest way to prevent corrosion is to use paint thereby blocking diffusion of corrosive component towards the metallic surface. Here we consider a new concept - the electronic barrier – for corrosion prevention. The barrier is an electronic p-n junction made by topping one film of functionalized carbon nanotubes on another. The barrier is constructed such that the positive ions in the electrolyte are prohibited from reaching the metallic surface through electronic screening. Potentiodynamic tests, Raman spectroscopy and inspection by scanning electron microscope revealed that the order of the layers (namely, p-n or n-p with respect to the metal surface does determine whether the metal corrodes or not. Numerical analysis of the structure will be provided as well.

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Date submitted: 20 Nov 2008 Electronic form version 1.4