Abstract Submitted
for the 4CF17 Meeting of
The American Physical Society

Electrical Conductivity of Monolayer Films of Ferritin Molecules
ALESSANDRO PEREGO, JOHN COLTON, ROBERT DAVIS, Brigham Young Univ - Provo — Ferritin is a 12 nm diameter spherical protein with an 8 nm hollow interior, which naturally contains iron oxide nanocrystals. The natural core of ferritin can be removed and other metal oxide nanoparticles can be synthesized inside the empty ferritin cage. The choice of metal used for the growth of the nanoparticles determines different properties for light harvesting and/or for oxidative charge. Knowledge of the electrical conductivity of the protein shell is critical to the performance of ferritin-based nano applications like quantum dots solar cells and nanobatteries. Here we use a 500 μm diameter gold ball as a contact probe to measure the conductivity of a sub monolayer of ferritin molecules. The contact force between the spherical probe and the surface is gradually increased until a stable I-V curve is obtained. At this current research stage, we show conductivity measurements for apoferritin and for different holoferritin molecules loaded with different amount of iron ions. Results show an increase in conductivity as the iron load increases inside the protein, indicating that for holoferritin most electron-transfer goes through the ferrihydrite core.

Alessandro Perego
Brigham Young Univ - Provo

Date submitted: 05 Sep 2017 Electronic form version 1.4