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Electrochemical and Optical Characterization of Metal-Decorated Carbon Nanotubes[1] TATYANA SHEPS, VAIKUNTH R. KHALAP, ALEXANDER A. KANE, PHILIP G. COLLINS, Department of Physics and Astronomy, University of California Irvine, Irvine, CA 92697-4576 , HYUN-MIN KIM, ERIC O. POTMA, Department of Chemistry, University of California Irvine, Irvine, CA 92697-4576 — Hybrid electrodes combining carbon nanotubes with metal and metal oxide particles are promising for many catalytic applications including energy conversion and energy storage. Understanding the chemical interactions between the nanotube substrate and the catalytic nanopaticle is crucial for optimizing these types of electrodes. Here, we describe techniques for interrogating the metal-nanotube interface on the single-molecule level, using isolated single-walled nanotubes (SWNTs) decorated by single metal particles as the most basic, representative element of a bulk hybrid electrode. The resulting composite and its chemical interface is studied by two complementary techniques, electrochemical voltammetry and Raman spectroscopy. Results comparing the electrochemical behavior with the surface chemistry are presented.

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