Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Electrochromic Tuning of Transparent Gold Nanorods with Poly[(3,4-propylenedioxy)pyrrole] Shells in the Near-Infrared Region

Jing Zhou,[a] Ju-Won Jeon,[a,b] James F. Ponder Jr.,[c] Jeffrey A. Geldmeier,[a] Mahmoud A. Mahmoud,[c,d] Mostafa El-Sayed,[c] John R. Reynolds,[a,c] Vladimir V. Tsukruk[a]*

[a] School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia 30332-0245 (USA)

[b] Department of Chemical & Biological Engineering, The University of Alabama, Tuscaloosa, Alabama 35487-0203 (USA)

[c] School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia 30332-0400 (USA)

[d] Department of Biomedical Engineering, The University of Texas at San Antonio, San Antonio, Texas 78249 (USA)

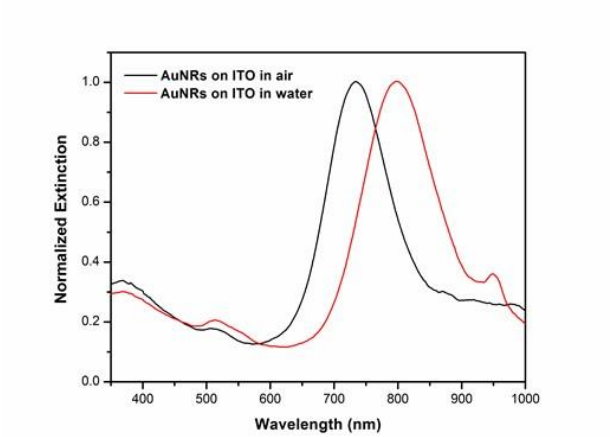

Fig. S1 UV-Vis spectra of AuNRs on ITO substrates in air and in water.

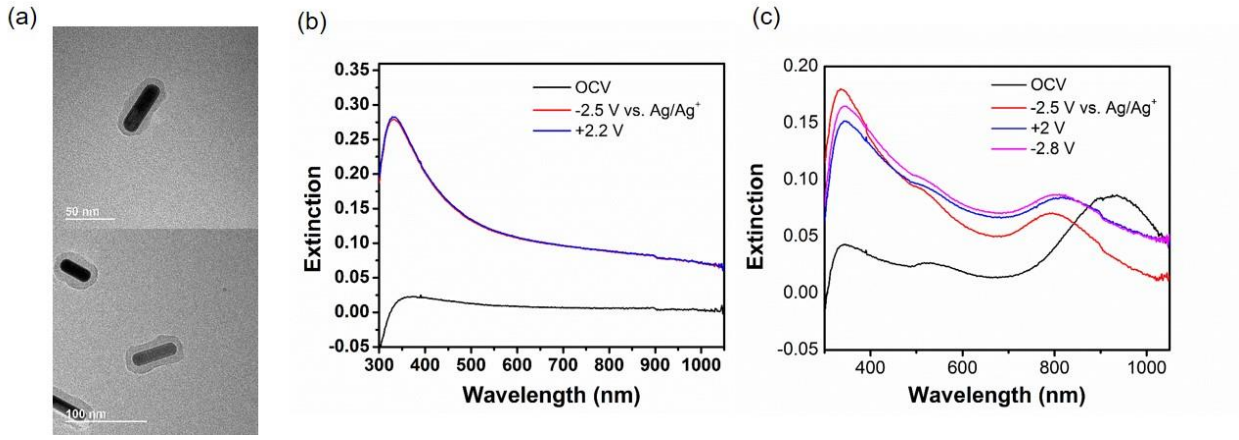

Fig. S2 (a) TEM images of AuNR@PPy after one (top) and two (bottom) polymerization cycles. (b) Spectroelectrochemistry of PPy on ITO substrates. Potential was stepped from -2.5 V to 2.2 V vs. Ag/Ag^+. (c) Spectroelectrochemistry of AuNR@PPy with 3 polymerization cycles on ITO substrates. Potential was stepped between -2.5 V, 2.0 V, and 2.8 V vs. Ag/Ag^+.

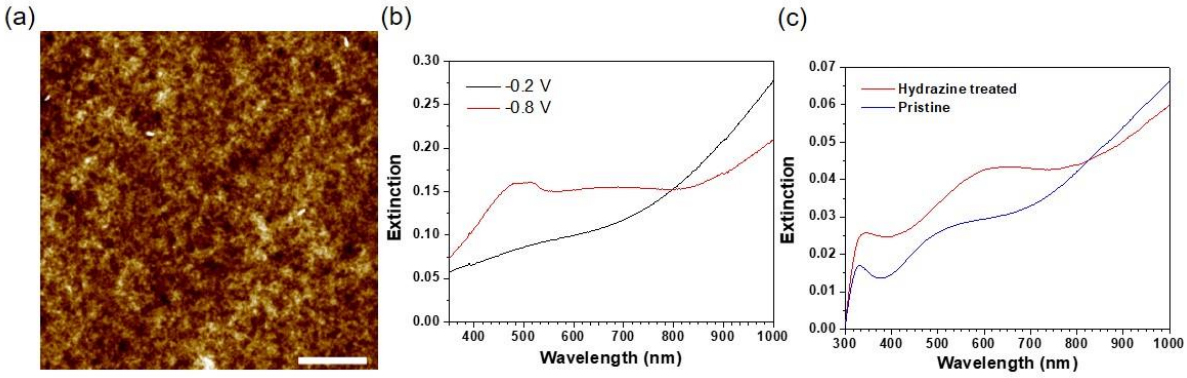

Fig. S3 (a) An AFM topography image of electropolymerized PProDOP on Au substrate. (b) Spectroelectrochemistry of electropolymerized PProDOP on ITO substrates. (c) Extinction spectra of electropolymerized PProDOP film before and after hydrazine treatment.

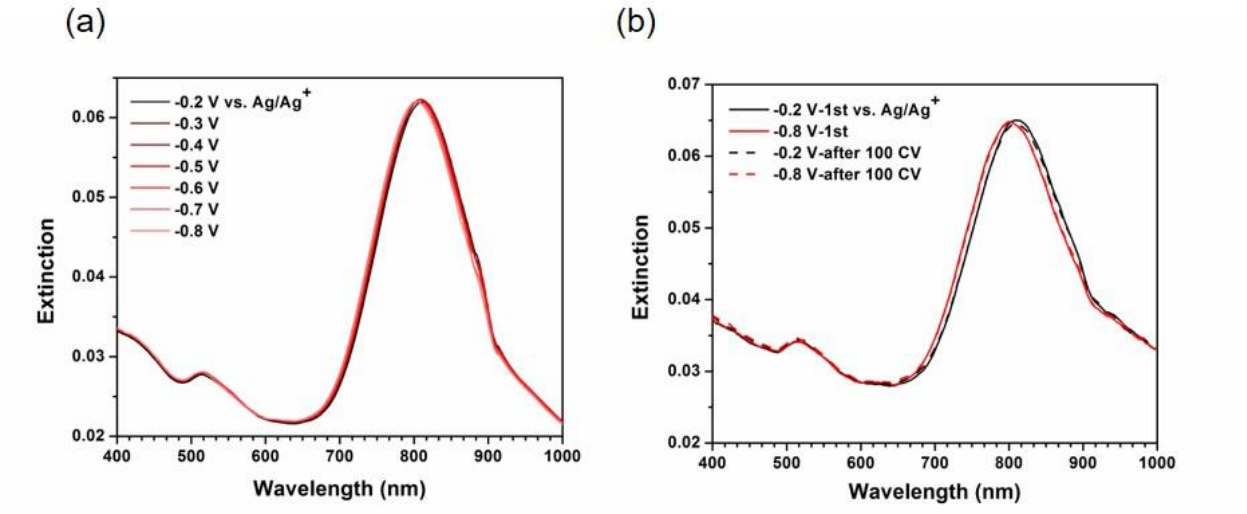

Fig. S4 (a) Spectroelectrochemistry of bare AuNRs on ITO substrates in 0.5 M $TBAPF_6$/PC. Potential was stepped from -0.8 V to -0.2 V vs. Ag/Ag^+ in 0.1 V increments. (b) Comparison of the extinction spectra of AuNRs before and after 100 CV cycles.

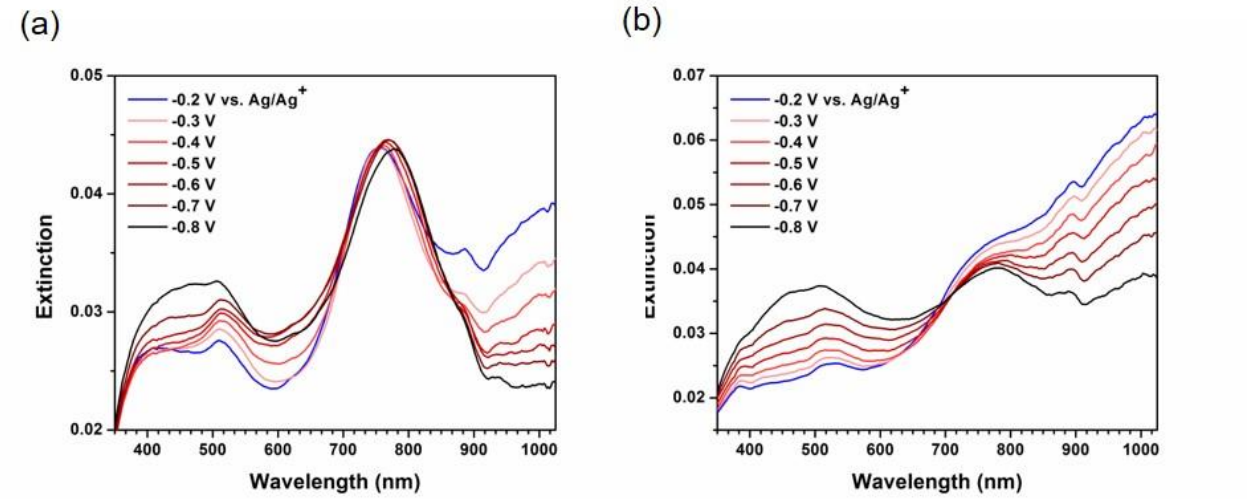

Fig. S5 Electrochromic behavior of AuNR@PProDOP with (a) 22 nm and (b) 30 nm shell thicknesses in 0.5 M $TBAPF_6$/PC. The potential was stepped from -0.8 V to -0.2 V vs. Ag/Ag^+ in 0.1 V increments.

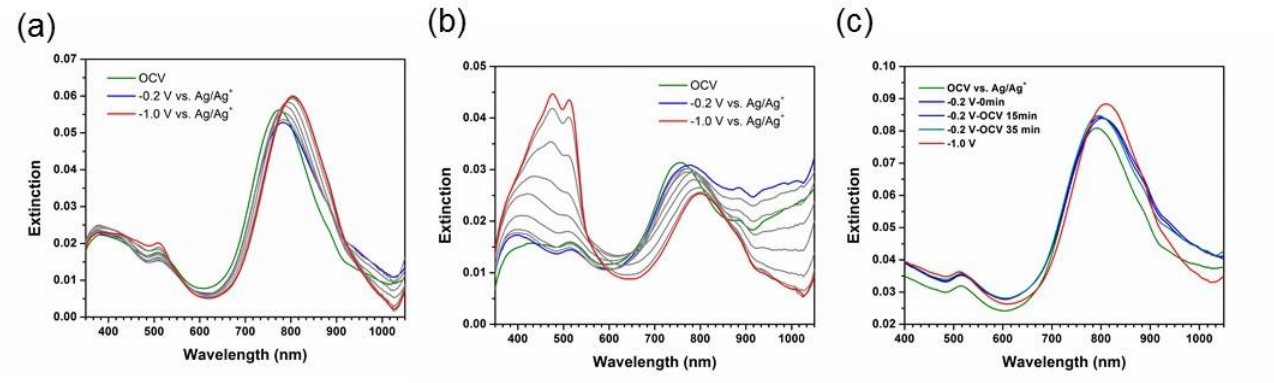

Fig. S6 Electrochromic behavior of AuNR@PProDOP with (a) 8 nm and (b) 22 nm shell thicknesses in 0.5 M $TBAPF_6$/PC. The potential was stepped from -1.0 V to -0.2 V vs. Ag/Ag^+ in 0.1 V increments. (c) The evolution of the UV-Vis spectra of AuNR@PProDOP with an 8 nm shell thickness at open circuit voltage after the potential was stepped back from -1.0 to -0.2 V.

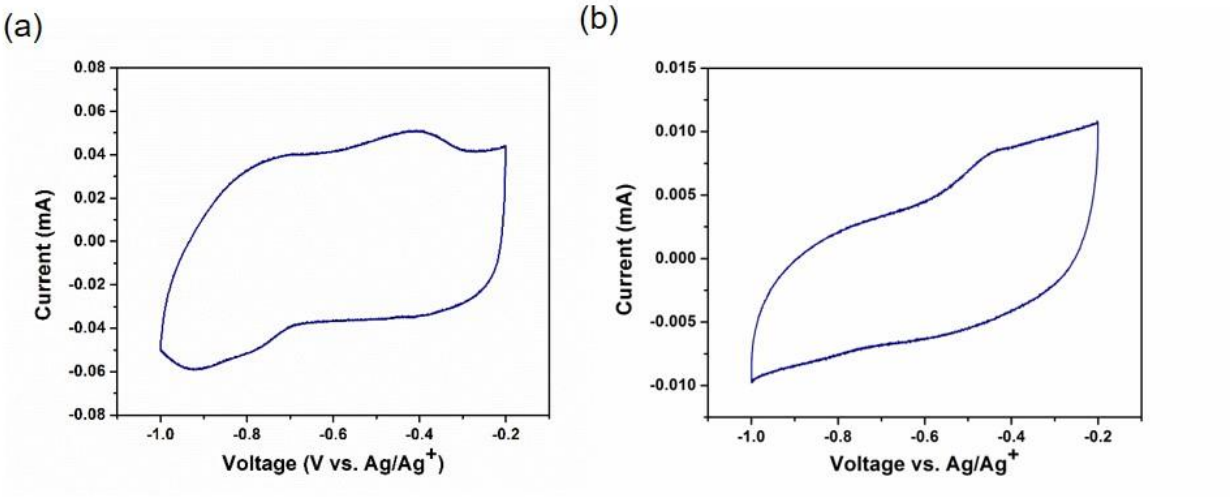

Fig. S7 Cyclic voltammogram of (a) PProDOP and (b) AuNR@PProDOP with an 8 nm shell thickness between -1.0 V to -0.2 V with a scan rate of 50 mV/s.