608e Reversible Switching of Conducting Polymer Films between Superhydrophobicity and Superhydrophilicity

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Superhydrophobic conducting polypyrrole (PPy) films are electrochemically deposited in acetonitrile electrolyte containing pyrrole monomer, perfluorooctanesulfonate (PFOS) and tiny amount of Fe (III). As-synthesized PFOS-doped (oxidized) PPy films exhibit extended porous structure with both coarse and fine scale roughness. The water contact angle is ~ 152º, and the contact angle hysteresis is ~ 8º. Reducing the PFOS-doped PPy by negative potential leads to neutral (undoped) PPy films, which are superhydrophilic (water contact angle close to 0º). By controlling the electrical potential, PPy films are changed between oxidized state and neutral state, resulting in reversibly switchable superhydrophobic and superhydrophilic surface. Details on the preparation and characterization of the PPy films are presented including contact angle measurements, scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS), UV-Vis spectroscopy, FT-IR spectroscopy, cyclic voltammetry (CV), and conductivity measurements.