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UVO Tunable Superhydrophobic to Superhydrophilic Wetting Transition on Biomimetic Nanostructured Surfaces ALAMGIR KARIM, JOONG TARK HAN, SANGCHEOL KIM, NIST — A novel strategy for a tunable sigmoidal wetting transition from superhydrophobicity to superhydrophilicity on a continuous nanostructured hybrid film via gradient UV-ozone (UVO) exposure is presented. Along a single wetting gradient surface (40 mm), we could visualize the superhydrophobic ($\theta_{H2O} > 165^o$ and low contact angle hysteresis), transition ($165^o > \theta_{H2O} > 10^o$) and superhydrophilic ($\theta_{H2O} < 10^o$ within 0.5 s or less) regions simply through the optical image of water droplets on the surface. The film is prepared through layer-by-layer assembly of negatively charged silica nanoparticles (11 nm) and positively charged poly(allylamine hydrochloride) with a initial deposition of fractal manner. The extraordinary wetting transition on chemically modified nanoparticle layered surfaces with submicron to microns scale pores represents a competition between chemical wettability and hierarchical roughness of surfaces as often occurs in nature (e.g., lotus leaves, insect's wings, etc).

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