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Hybrid nanostructured thin films which adapt low adhesive properties in changing environment[1] SERGIY MINKO, ROMAN SHEPAROVYCH, Clarkson University — We describe a nanostructured composite coating constituted of surface-grafted hydrophobic nanoparticles embedded in a hydrophilic, polyethylene oxide molecular brush. The responsive coating undergoes reconstruction from the morphology of rigid hydrophobic asperities, which hide the collapsed polymer brush in air, to the morphology of a hydrophilic brush-like layer engulfing the nanoparticles underwater. Due to this reconstruction, the coating demonstrates low adhesion to hydrophilic, hydrophobic, and amphiphilic materials in both dry and wet environments. The key property of the designed layer is the size of the nanoparticles that is bigger than the collapsed in air and smaller than the stretched in water polymer coil in the brush. This finding provides useful guidelines for the development of low-adhesive surfaces of materials.

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