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Modifying material surfaces by siloxane-based coatings ALI OZCAM, JAN GENZER, NC State University — We report on a simple, robust, and rapid method of modifying materials surfaces by using poly(vinylmethyl siloxane)-trichlorosilane (PVMS-TCS) coatings. PVMS-TCS is synthesized by hydrosililation coupling between trichlorosilane (TCS) and poly(vinylmethyl siloxane) (PVMS). Spin-coating PVMS-TCS onto a substrate results in a uniform coating layer, which can be further stabilized by cross-linking. Exposing the coating to minute amounts of moisture generates a large density of surface-bound hydroxyl groups on the surface of PVMS-TCS. Moreover, by treating the PVMS-TCS substrates with ultraviolet/ozone (UVO) treatment increases one can both further increase the density of the surface-bound hydroxyl groups and the coating's elastic modulus. The applicability of PVMS-TCS and PVMS-TCS/UVO coatings was tested by decorating various surfaces, including, poly(ethylene terephthalate) and glass, with semifluorinated organosilanes and organosilane-based initiators for surface initiated polymerization. The physico-chemical properties of the functional coatings were studied with a battery of experimental probes, including near-edge x-ray absorption fine structure spectroscopy, x-ray photoelectron spectroscopy, contact angle, atomic force microscopy, ellipsometry, and nanoindentation.

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