

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Development of universal coatings based on functional silicones

ALI OZCAM, RICHARD SPONTAK, JAN GENZER, NC State University — The development of a universal polymer coating prepared by the chemical coupling of trichlorosilane (TCS) to the vinyl groups of poly(vinylmethyl siloxane) (PVMS) is reported. The resultant PVMS-TCS material can be deposited as a functional organic layer on a variety of substrates ranging from hydrophobic to hydrophilic. The hardness of the material can likewise be regulated by adjusting the TCS concentration. Several case studies demonstrating the remarkable properties of these PVMS-TCS functional coatings will be presented. In particular, PVMS-TCS is found to serve as a convenient precursor for the deposition of organosilanes and the subsequent growth of polymer brushes, even on hydrophobic surfaces. In addition, PVMS-TCS can also be employed as a compatibilizing medium for functional silicone elastomer coatings composed of multilayered structures. The physical and chemical characteristics of these versatile PVMS-TCS coatings have been interrogated by a battery of experimental probes, including optical microscopy, near-edge x-ray absorption fine structure spectroscopy, x-ray photoelectron spectroscopy, Fourier-transform infrared spectroscopy, contact-angle measurements, atomic force microscopy, ellipsometry, and surface nanoindentation.

Ali Ozcam
NC State University

Date submitted: 20 Nov 2009

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