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Influence of curing temperature on properties of GPS adhesion promoter layers[1] ELISABETH PAVLOVIC, EDWARD J. KRAMER, SHIGEO NAKAMURA, University of California Santa Barbara, MICHAEL KENT, HYUN YIM, Sandia National Laboratories — Adhesion promoter layers of glycidoxypropyltrimethoxysilane (GPS) were cured at various temperatures ranging from room temperature to 250 degC. The degree of cross-linking was investigated using infrared spectroscopy combined with deuterium/hydrogen exchange. The swelling of the GPS layers by solvent (d-nitrobenzene) and water was investigated using x-ray and neutron reflection. Curing temperatures higher than 90 degC produced highly cross-linked GPS layers, with a loss of epoxy groups. A complete cross-linking was reached at a curing temperature of 250 degC. We expect that the cross-link density of the GPS layer, and subsequently its swelling ability, as well as its remaining epoxy functionality should have a major impact on the fracture energy of the interface with epoxy. These questions are investigated by asymmetric double cantilever beam fracture experiments on interfaces between GPS layers cured at these different temperatures on silicon wafers and epoxy resin beams.

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Elisabeth Pavlovic
University of California Santa Barbara

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