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Adhesive Transfer of Thin Viscoelastic Films KENNETH SHULL, RACHEL MCSWAIN, Northwestern University — Micellar suspensions of acrylic diblock copolymers are excellent model materials for studying the adhesive transfer of viscoelastic solids. The micellar structure is maintained in films with a variety of thicknesses, giving films with a well-defined structure and viscoelastic character. Thin films were cast onto elastomeric silicone substrates from micellar suspensions in butanol, and the adhesive interactions between these coated elastomeric substrates and a rigid indenter were quantified. By controlling the adhesive properties of the film/indenter and film/substrate interfaces we were able to obtain very clean transfer of the film from the substrate to the portion of the glass indenter with which the film was in contact. Adhesive failure at the film/substrate begins with the nucleation of a cavity at the film/substrate interface, followed by complete delamination of this interface. The final stage in the transfer process involves the failure of the film that bridges the indenter and the elastomeric substrate at the periphery of the contact area. This film is remarkably robust, and is extended to three times its original length prior to failure. Failure of this film occurs at the periphery of the indenter, giving a transferred film that conforms to the original contact area between the indenter and the coated substrate.

Kenneth Shull
Northwestern University

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