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Interface adhesion between 2D materials and elastomers measured by buckle delamination CHRISTOPHER BRENNAN, NANSHU LU, Univ of Texas, Austin — A major application for 2D materials is creating electronic devices, including flexible and wearable devices. These applications require complicated fabrication processes where 2D materials are either mechanically exfoliated or grown via chemical vapor deposition and then transferred to a host substrate. Both processes require intimate knowledge of the interactions between the 2D material and the substrate to allow for a controllable transfer. Although adhesion between 2D materials and stiff substrates such as silicon and copper have been measured by bulge or peeling tests, adhesion between 2D materials and soft polymer substrates are hard to measure by conventional methods. Here we propose a simple way of measuring the adhesion between 2D materials and soft, stretchable elastomers using mature continuum mechanics equations. By creating buckle delamination in 2D atomic layers and measuring the buckle profile using an atomic force microscope, we can readily extract 2D-elastomer adhesion energy. Here we look at the adhesion of MoS2 and graphene to PDMS. The measured adhesion values are found insensitive to the applied strains in the substrate and are one order smaller than 2D-silicon oxide adhesion which is mainly attributed substrate surface roughness differences.

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