

Measurements of Adhesion in Alumina/Glass-Epoxy System Using Spherical Indentation

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Bonded systems between different material families (metals, ceramics, and polymers), and within each family are widely used, e.g., polymer coated dielectrics, encapsulated electronic packages, brazed and soldered assemblies, glass to metal seals, plated and coated electrical contacts, coatings on tribological materials, and arc-sprayed components. The performance of such systems is often limited by the adhesion between the layers. Experimental observations and measurements of interfacial properties in glass-epoxy and alumina-epoxy system are described. Spherical indenters were used to induce delaminations at the interface. The load for initial delamination was used to measure the interfacial strength, while the load-crack length relationships are used to estimate interfacial toughness. Surface modifications of the alumina and glass surfaces and their effects on interface adhesion are also described. Fracture surface observations and cross-sectional views of the delaminated regions were used to understand the physical processes occurring at the delamination site.

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