**Adhesion Strength of Block Copolymer Modified Epoxy Structural Adhesives**

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**Extended Abstract:**

Epoxies coatings and structural adhesives are used widely in the aerospace, automotive, and consumer goods industries. Prior studies have shown that the addition of block copolymers (BCPs) to epoxy resins can increase the bulk fracture toughness of these cured epoxies. However, little work has been done to understand the adhesive properties of these modified epoxy systems. In this work, the influence of self-assembled BCP nanostructures on the adhesion strength of epoxy thermosets was evaluated.1 Poly(ethylene-*alt*-propylene)-*b*-poly(ethylene oxide) BCP modifiers of various poly(ethylene oxide) weight fractions were mixed into epoxy resins, forming well dispersed nanoscale structures. Two self-assembled morphologies were observed and studied: spherical micelles and bilayer vesicles. For both nanostructure morphologies, the modified epoxies exhibited significant improvements in bulk fracture toughness, with no reduction in elastic modulus and glass transition temperature. Single-lap-joint shear tests showed a significant (~46%) increase in the adhesion strength when spherical micelle modified epoxies were tested on surface roughened aluminum. In contrast, vesicle-forming modifiers were detrimental, with a 28% reduction in adhesion strength. Possible mechanisms for the adhesion strength results will be discussed.

# V. Pang, Z. J. Thompson, G. D. Joly, F. S. Bates, L. F. Francis, Adhesion Strength of Block Copolymer Toughened Epoxy on Aluminum, *ACS Applied Polymer Materials* **2020**, *2*, 464-474.