

Abstract Submitted
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Effects of Cure Process Pathway on Toughened Thermoset Resin Topology and Morphology: A molecular dynamics study CARLA ESTRIDGE, Boeing — During industrial processing of thermoset composite materials the epoxy resin systems experience numerous temperature and pressure profiles. Differences in the processing parameters may lead to differences in the ultimate performance of the material. In order to understand the molecular level origins of these differences in performance we have designed atomistic and coarse grained simulations that target understanding process induced variations in molecular level *topology*, the polymeric network formation, and *morphology*, the reaction induced phase separation of thermoset networks from thermoplastic toughening agents. We show how the cure path (ramp rate, hold temperatures and steps) has a significant impact on the molecular architecture of the resin systems and how we may use this information when designing process pathways for our thermoset composite materials.

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