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"Fundamental Issues in Characterizing and Modeling Fiber/matrix Interfaces and Their Impact on Failure Analysis of Polymer Matrix Composites"

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It is believed that interfaces between fibers and matrix hold the key to understanding how composites behave and how their performance can be tailored. Traditionally, materials scientists focus on characterizing interface properties in terms of "strength" and "toughness", while in mechanics one develops models to describe initiation and progression of failure at interfaces. One issue that must be addressed in any such model is whether the constants entering in the model are truly material properties. Cohesive zone models are examples of this difficulty.



This presentation will address the potential flaws in characterizing interface properties and will clarify the mechanics concepts underlying what is called strength and toughness. An example of unidirectional polymer matrix composites subjected to transverse tension will be taken where these properties, when properly interpreted can explain the role of interfaces in governing failure initiation.