**Role of Interface on Fracture Behavior of Polymethylmethacrylate/Metal Organic Framework Nanocomposites**

C. Liu, Z. Zhu, K. Noh, M. Mullinsand H.-J. Sue\*

1Polymer Technology Center, Department of Material Science and Engineering, Texas A&M University, College Station, Texas 77843, USA

**Abstract:**

Significant research has investigated the importance of interface on influencing tensile properties of polymer nanocomposites. Few places an emphasis on how the interface affect their fracture behavior. In this work, a set of model systems based on polymethylmethacrylate (PMMA) matrix containing polyalkylglycidylether brushes grafted on 50 nm metal-organic-framework (MOF) nanoparticles were synthesized and studied. By systematically synthesizing brush length and graft density of polyalkylglycidylether on MOF nanoparticles, the fracture behavior of PMMA/MOF nanocomposite is found to change from forming a few big crazes to massing crazing, and to massive shear banding, which results in significant improvement in fracture toughness. The implication of the present finding for the design of high performance, multi-functional polymer nanocomposites is discussed.



 Short brush length Long brush length and low graft density Long brush length and high graft density