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### **How Does POSS Influence Polymer Properties?**

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Research into the influence of polyhedral oligosilsesquioxane (POSS) incorporation within polymers on microstructural and physical properties, including thermal, fracture, and rheological properties, is beginning to reveal the mechanisms by which such properties are enhanced. This talk will first survey the structure and properties of POSS-based polymers where POSS is incorporated via various architectural approaches, including random copolymers, block copolymers, telechelics, and dispersions. A significant sensitivity of the rheological, thermal, and solid mechanical properties on the POSS vertex “R” groups indicates the importance of molecular-level interactions, while sensitivity to the incorporation architecture demonstrates the role of nanometer-scale assembly. After giving tentative conclusions on the ways in which POSS influences polymer properties, applications exploiting the novel thermal and mechanical properties will be discussed.