UCLA Chemistry & Biochemistry

Organic **Seminar**

Presents:

Prof. Yan Xia

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"Building and Breaking Macromolecular Ladders to Develop Microporous and Force-Responsive Polymers"

Abstract: Our interest in utilizing and incorporating strained rings in ladder-shaped molecular structures led to the development of unusual polymers. We developed Catalytic Arene-Norbornene AnnuLation (CANAL) to synthesize rigid ladder polymers from readily available norbornenes and aryl bromides. Efficient CANAL polymerization produced rigid ladder polymers with very high molecular weights, contorted conformations, and various functionalities. These ladder polymers exhibited high microporosity (pore width < 1 nm) and surprisingly high thermal stability up to 400 °C without detectable T_g. Membranes from these polymers were fabricated for gas separation and understanding gas transport in glassy polymers.

In the quest for synthetic materials that respond to mechanical stress in a multifaceted and dramatic fashion, we developed a unique family of polyladderenes, which readily unzip under force to form conjugated polymers with long conjugation. The force-induced unzipping of macromolecular ladders opens new avenues for smart materials that transform their intrinsic properties drastically under stress and understanding details of mechanotransduction in polymers.

4:00 PM | Thursday, May 23 | CS 24

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