

OSE SEMINAR SERIES



Dr. Yang Qin

UNM Department of Chemistry and Chemical Biology

Improving Polymer Solar Cell (PSC) Performance through Cooperative Non-Covalent Interactions

Wednesday, Feb. 5, 2014, 12:30-1:30pm, CHTM, Room 101

Abstract: Polymer solar cell (PSC) devices offer an intriguing alternative to traditional silicon based solar cell technologies, due to versatility in material structural, and thus functional, variations and amenability to low-cost high throughput solution processes. In order for PSCs to receive wide acceptance and possible commercialization, both device efficiencies and stabilities need to be further improved. One of the major bottlenecks that limit PSC performance is the uncontrolled and unstable bulk heterojunction (BHJ) morphologies in active layers of most state-of-the-art devices. Our strategy to overcome this problem is based on synthetic methodologies and supramolecular chemistry. Specifically, conjugated block copolymers and fullerene derivatives selectively functionalized with complementary hydrogen bonding units have been designed and prepared in well-defined fashion. Self-assembly of resulting supramolecular complexes has resulted in stable and controllable BHJ morphologies. By carefully adjusting the interplay among such orthogonal non-covalent interactions, stable morphologies having tunable domain sizes and shapes have been obtained. Our methodology can be further extended to other polymer systems possessing low bandgaps and potentially lead to more robust and high performing PSC devices.

Biography. Yang Qin received his PhD degree in chemistry from Rutgers University in 2006. After spending three years at the University of Minnesota and one year at Brookhaven National Laboratory as postdoctoral researchers, he joined the Department of Chemistry & Chemical Biology at UNM in 2010. Research in his group is currently focused on design and synthesis of organic materials for solution processed electronic devices.