Bar-Ilan University
אוניברסיטת בר-אילן

Faculty of Exact Sciences
Department of Chemistry

הפקולטה למדעים מדויקים
המחלקה לכימיה

S P E C I A L S E M I N A R

Wednesday 08/01/2020, 11:00 am

Building 211, seminar room

SPEAKER:

Dr. Revital Kaminker

Materials Research Laboratory,
University of California

TOPIC:

Towards Advanced Materials: From Unique Peptidomimetics to High-Performance Thermosets

Abstract:

High-performance materials, with elevated operating temperatures and robust properties, are essential for a wide variety of emerging applications. For example, the combination of high thermal stability, excellent mechanical properties, and good adhesion are required for various applications in functional adhesives, aerospace, and coatings. Polyhexahydrotriazines (PHT) are new promising high-performance thermosets exhibiting enhanced thermal and mechanical properties.[1] The performance and utility of PHT-based materials would be further enhanced by the ability to design new material properties based on changes in the molecular structure.[2] In my work, I demonstrated a new solvent-free approach for the fabrication of PHT based on low-melting-point diamines enabling the production of adhesives with comparable properties to well-established epoxy adhesives. Furthermore, these versatile materials could be degraded at different rates in acidic conditions based on the nature of the starting diamine molecular structure. Controlling the degradation is extremely valuable in composites and adhesives in order to be able to recycle and rework the materials.

In the second part of my talk I will demonstrate how the ability to control and adapt peptide conformation is crucial for the rational design and control of their function.[3,4] We demonstrated by Double Electron-Electron Resonance (DEER) EPR end-to-end distance measurements that we can tune the peptide backbone extension/compactness while maintaining the sequence of the side-chains. Interestingly, the backbone tuning has an effect on peptide propensity to aggregate or stabilize nanoparticles. Such knowledge is critical for designing new bio-hybrid materials for various biotechnological applications.

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2. **R. Kaminker**, E. B. Callaway, N. D. Dolinski, S. M. Barbon, M. Shibata, H. Wang, J. Hu, C. J. Hawker, *Chem. Mater.* **2018**, *30*, 8352–8358.
3. **R. Kaminker**, I. Kaminker, W. R. Gutekunst, Y. Luo, S.-H. Lee, J. Niu, C. J. Hawker, S. Han, *Chem. Commun.* **2018**, *54*, 5237–5240.
4. **R. Kaminker**, A. Anastasaki, W. R. Gutekunst, Y. Luo, S.-H. Lee, C. J. Hawker, *Chem. Commun*. **2018**, 54, 9631–9634.