Liquid Phase and High Throughput TEM for New Organic Nanomaterials

Martedì, 4 Febbraio, 2020

14:00

Aula II

Dipartimento di Chimica "Giacomo Ciamician"
Via F. Selmi 2
40126 – Bologna

Nathan Gianneschi

Northwestern University, Evanston, IL (USA)

CHIM 2018-2022 Dipartimento di Eccellenza MIUR

Liquid Phase and High Throughput TEM for New Organic Nanomaterials

Nathan C. Gianneschi*

Department of Chemistry, Department of Materials Science & Engineering, Department of Biomedical Engineering, Department of Pharmacology, Northwestern University, 2145 Sheridan Rd, Evanston IL, United States of America

Amphiphilic small molecules and polymers form commonplace nanoscale macromolecular compartments and bilayers, and as such are truly essential components in all cells and in many cellular processes. The nature of these architectures, including their formation, phase changes, and stimuli-response behaviors are necessary for the most basic functions of life, and over the past half-century, these natural micellar structures have inspired a vast diversity of industrial products, from biomedicines to detergents, lubricants and coatings. The importance of these materials and their ubiquity, have made them the subject of intense investigation regarding their nanoscale dynamics with increasing interest in obtaining sufficient temporal and spatial resolution to directly observe nanoscale processes. However, the vast majority of experimental methods involve either bulk-averaging techniques including light, neutron and X-ray scattering, or are static in nature including even the most advanced cryogenic transmission electron microscopy techniques. Here, we describe *in situ* liquid cell transmission electron microscopy (LCTEM) for the direct observation of the evolution of individual amphiphilic block copolymer micellar nanoparticles in solution, in real time with nanometer spatial resolution. Furthermore, we will describe the development of high throughput, automated methods for rapid screening of reaction conditions by TEM. Beyond amphiphilic self-assemblies we will explore other organic materials, biomaterials and hybrid materials for their formation and growth in solutions including in aqueous and organic solvents.