DESIGNING BIONANOCOMPOSITE MICROCAPSULES AND NANOSHELLS
Vladimir V. Tsukruk

School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, USA

I discuss recent results from our research group on designing soft and strong responsive polymer and biopolymer nanocomposite materials and structures. Ultrathin silk fibroin proteins, cellulose nanocrystals, and star block copolymers are assembled in order to conduct surface modification and protection of microparticles, cells and cell assemblies, self-rolled arrays, and form responsive permeable microcapsules. Biocompatible, compliant and permeable LbL shells are formed from silk fibroins, their ionomers, and other derivatives and transferred onto various yeast and bacterial cells. Organized multiplexed arrays of ink-jet printed silk templates have been utilized for cell encapsulation with high viability and their long-term storage for biosensing arrays. On the other hand, ultra strong laminated bionanocomposites from silk fibroins and cellulose nanocrystals and graphene oxide sheets with unique interphase morphology were found to possess high elastic modulus and toughness as well as ability for conductive patterning with localized electrochemical reduction.

**Keywords:** flexible bionanocomposites, nanostructured interphases, touch sensors

**References:**


**Presenting author’s email:** vladimir@mse.gatech.edu