

MSE-Colloquium@NTU

24 February 2016, 4.00 pm

Lecture Theatre 6, Nanyang Technological University



Supramolecular Materials in Energy and Medicine

Professor Samuel I. Stupp
Northwestern University

About the Talk

Supramolecular soft matter has the potential to mimic the structures and dynamics of biological systems. It is therefore a rich platform for the development of bio-inspired materials. The interesting features of supramolecular soft materials include, nanoscale control of dynamics, highly responsive behaviour to external stimuli, capacity to self-heal defects, noncovalent co-localization of functional domains, and the use of self-assembly to optimize function, among many others. This lecture will first describe supramolecular soft materials that mimic the photosynthetic machinery in biological systems by integrating the necessary functions to generate solar fuels. Other energy relevant examples will be described in which supramolecular systems integrate electron donors and acceptors for photovoltaic behaviour or ferroelectric response. As a third topic, the lecture will discuss the development of highly dynamic bioactive supramolecular materials for biomedical applications. These materials mimic the architecture of extracellular matrices and have the capacity to promote regeneration of tissues by interacting with cells and triggering biological signalling pathways.

About the Speaker

Professor Samuel Stupp is Board of Trustees Professor of Materials Science, Chemistry, Medicine, and Biomedical Engineering at Northwestern University. He is the Director of Simpson Querrey Institute for BioNanotechnology and the Energy Frontiers Research Center for Bio-Inspired Energy Science, which is funded by the Department of Energy. Professor Stupp is a member of the National Academy of Engineering, the American Academy of Arts and Sciences, and the Spanish Royal Academy. He is a fellow of the American Physical Society and the Materials Research Society. His awards include the Department of Energy Prize for Outstanding Achievement in Materials Chemistry, the Materials Research Society Medal Award, the American Chemical Society Award in Polymer Chemistry, the American Chemical Society Ronald Breslow Award for Achievement in Biomimetic Chemistry, and the International Award from The Society of Polymer Science in Japan. He has received honoris causa doctorates from Eindhoven Technical University in the Netherlands, the University of Gothenburg in Sweden, and the National University of Costa Rica.