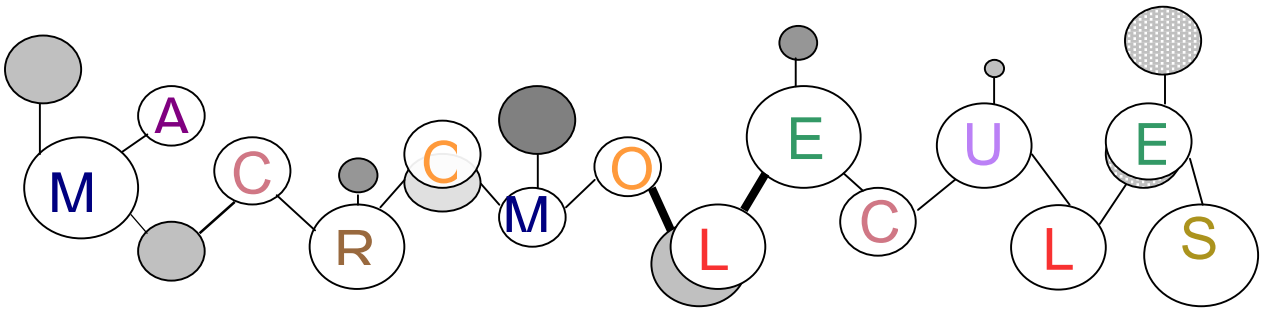

Monday,
August 17, 2015

3:00 pm

Room 8335
Chemistry Building

Control of Interfacial Structure and Dynamics of Vinyl Polymers for Bio-applications

Professor Yukari Oda
Department of Applied Chemistry
Kyushu University, Japan

Excellent bio-inert properties of polymeric materials are strongly affected by the structure and dynamics at the water interface, which should be controlled by the polymer design. In this study, a poly(vinyl ether) with PEO side-chains (PEOVEs) is examined in particular because it lacks a carbonyl group in the side-chain part compared to the acrylate polymers. Rubbery PEOVEs possess low surface free energy due to their activated molecular motions, leading to a preferential segregation at the air interface in a diblock copolymer with glassy poly(cyclohexyl vinyl ether). The block copolymer films are found to successfully suppress platelet adhesion and its activation. Aggregation states of the polymer chains as well as water molecules at the interfaces were examined using the sum-frequency generation vibrational spectroscopy. The surface conformation of the polymer films was greatly affected upon contact with water, leading to a variation of the aggregation states of water molecules at the interface. Furthermore, the physical properties of the polymer interfaces in contact with water were also examined using the scanning probe microscopy. These findings are used as significant ingredients for the design and construction of highly functionalized polymer interfaces for bio-applications.