Dear all,

Nanoparticles by Design Unit (Sowwan Unit) would like to announce a seminar by Prof. Aida, Takuzo, The University of Tokyo.

Date & Time: Monday, June 16th, 14:00-15:00
Venue: C210, Center Building

Speaker: Distinguished Prof. Aida, Tokuzo
Department of Chemistry and Biotechnology, School of Engineering, The Univerisity of Tokyo

The recipient of awards

2001: Tokyo Tecno Forum Awards, Gold Medal
2005: Inoue Prize for Science
2005: American Chemical Society Arthur K. Doolittle Award(PMSE)
2008: Chirality Award
2008: Coordination Chemistry Award
2009: The American Chemical Society Award in Polymer Chemistry
2009: The Chemical Society of Japan Award
2010 Medal with Purple Ribbon
2011: Alexander von Humboldt Research Award
2011: Fujihara Award
2012: Honorary Fellowship of the Chemical Research Society of India
2013: American Chemical Society Arthur K. Doolittle Award (PMSE)
2013: van't Hoff Award Lecture

Title: Aqua Materials

Abstract:

Water is essential for life on earth and considered a symbol of purity. 71% of the surface of our planet is covered by water, and our own body is composed of 65% of this simple but vital molecule. Considering increasing environmental issues, the idea of replacing plastics with water-based materials, so-called hydrogels, seems quite reasonable. Here we report that water and clay (2–3%), upon mixing with very minute amounts of organic components (< 0.4%), quickly form a transparent hydrogel (1). This material can be molded into shape-persistent freestanding objects owing to its exceptionally high mechanical strength, and instantaneously self-heals completely when destroyed. Furthermore, it preserves biologically active proteins for catalysis. Prior to our discovery, no hydrogels, including conventional ones formed by mixing polymeric cations and anions or polysaccharides and borax, have been reported to possess all these exceptional features. Noteworthy, this material is formed only by non-covalent forces resulting from the specific design of telechelic dendritic macromolecules with multiple adhesive termini for binding onto clay. In collaboration with Hawker and coworkers, linear versions of dendritic molecular binders were developed, which are quite efficient for the preparation of aqua materials (2). Furthermore, we also found that utilization of other sheet-shaped inorganic components provides aqua materials with very interesting functions (3–5).

References:

(1) Wang *et al.*, *Nature* **2010**, *463*, 339–343.
(2) Tamesue *et al.*, *J. Am. Chem. Soc.* **135**, 15650−15655 (2013).
(3) Liu *et al.*, *Nat. Commun.* **4**, 2029-1–7 (2013).