Pusan National University presents

BK21+ Special Lecture Series

(BK21+ 해외석학 특별강연 시리즈 #1)

인지메카트로닉스공학과에서는 BK21 플러스 글로벌인재 양성 사업을 위해 초빙된 해외 석학 교수님을 모시고 특별강연을 아래와 같이 개최하오니 여러분의 많은 관심 및 참여 바랍니다.

Dept. of Cogno-Mechatronics Engineering would like to invite you to our Special Lecture series led by renowned scholars worldwide. As visiting faculty members of the BK21 PLUS project, the following speakers are about to share with you fascinating discoveries in their studies.

◇ Place: **Small Auditorium, Induk Hall (인덕관, 소강의실),**
Jang-Jeon Campus, Busan Campus, Pusan National University

◇ Title: **Biomimetic Self-templating Assembly and Applications**

◇ Time: **January 7, 2014 (Tue), 4:00pm ~ 5:30pm**

◇ Speaker: **Prof. Seung Wuk Lee, Ph.D.**

Bioengineering, University of California, Berkeley and Lawrence Berkeley National Laboratory Berkeley, CA 94720 USA

In nature, helical macromolecules such as collagen, chitin and cellulose are critical to the morphogenesis and functionality of various hierarchically structured materials. During morphogenesis, these chiral macromolecules are secreted and undergo self-templating assembly, a process whereby multiple kinetic factors influence the assembly of the incoming building blocks to produce non-equilibrium structures. A single macromolecule can form diverse functional structures when self-templated under different conditions. Collagen type I, for instance, forms transparent corneal tissues from orthogonally aligned nematic fibres, distinctively coloured skin tissues from cholesteric phase fibre bundles, and mineralized tissues from hierarchically organized fibres. Nature's self-templated materials surpass the functional and structural complexity achievable by current top-down and bottom-up fabrication methods. However, self-templating has not been thoroughly explored for engineering synthetic materials.

In my seminar, I will demonstrate a facile biomimetic process to create functional nanomaterials utilizing chiral colloidal particles (M13 phage). A single-step process produces long-range-ordered, supramolecular films showing multiple levels of hierarchical organization and helical twist. Using the self-templating materials assembly processes, we have created various biomimetic supramolecular structures. The resulting materials show distinctive optical and photonic properties, functioning as chiral reflector/filters and structural colour matrices. Through the genetic engineering of the M13 phages, I will also show how resulting materials can be utilized as functional nanomaterials for biomedical, biosensor and bioenergy applications.

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