

Chemical Engineering Department Presents:  
Designed Chemical Synthesis and Assembly of Inorganic Nanomaterials  
for Medical Applications

**Professor Taeghwan Hyeon**  
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**South Korea**

Friday, May 4, 2018  
66-110  
Reception 1:30 – 2:00 PM  
Lecture 2:00 – 3:00 PM

Over the last 18 years, our laboratory has focused on the designed chemical synthesis, assembly and applications of uniform-sized nanocrystals. In particular, we developed a novel generalized procedure called as the “heat-up process” for the direct synthesis of uniform-sized nanocrystals of many metals, oxides, and chalcogenides.

For the last 10 years, our group has been focused on medical applications of various uniform-sized nanoparticles. Using 3 nm-sized iron oxide nanoparticles, new non-toxic MRI contrast agent was realized for high resolution MRI of blood vessels down to 0.2 mm. Very recently, we report on the biocompatibility evaluation and MR imaging of extremely small and uniform-sized iron oxide nanoparticles in large animal models including most clinically-relevant non-human primates. These biocompatible iron oxide nanoparticles are successfully used as T1 MR contrast agent for high-resolution MR angiography of macaque monkeys.

I will present recent advances on the fabrication of ultraflexible and stretchable electronic and optoelectronic devices integrated with various functional nanomaterials and their applications to wearable and implantable healthcare devices. We reported graphene-hybrid electrochemical devices integrated with thermo-responsive micro-needles for the sweat-based diabetes monitoring and feedback therapy. We introduced electromechanical cardioplasty using an epicardial mesh made of electrically conductive and mechanically elastic silver nanowire-rubber composite material to resemble the innate cardiac tissue and confer cardiac conduction system function.

**Short Biography of Taeghwan Hyeon**

Taeghwan Hyeon is a Seoul National University (SNU) Distinguished Professor and a Director of Center for Nanoparticle Research of Institute for Basic Science (IBS). Since he joined the faculty of the School of Chemical and Biological Engineering of Seoul National University in September 1997, he has been focused on the synthesis and applications of uniform-sized nanoparticles and related nanostructured materials, and published > 350 papers in prominent international journals (>41,000 citations and h-index of > 110). In 2011, he was selected as “*Top 100 Chemists*” of the decade by *UNESCO&IUPAC*. He is Fellow of Royal Society of Chemistry (RSC) and Materials Research Society (MRS). He received many awards including the Korea S&T Award from Korean President (2016), Hoam Prize (2012, Samsung Hoam Foundation), POSCO-T. J. Park Award (2008), the IUVESTA Prize for Technology (International Union for Vacuum Science, Technique and Applications, 2016). Since 2010, he has served as an *Associate Editor of J. Am. Chem. Soc.*

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