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中国科学院上海硅酸盐研究所高性能陶瓷和超微结构国家重点实验室

2023 年度国家重点实验室特邀学术报告

What and How can Nano do for Medicine?

Prof. Taeghwan Hyeon

Seoul National University

时间：2023 年 9 月 5 日（星期二）上午 10:00

地点：长宁园区 2 号楼 607 会议室

欢迎广大科研人员和研究生参与讨论！

联系人：施剑林（52412712）

报告摘要:

Over the last 20 years, our laboratory has focused on the designed chemical synthesis, assembly and medical applications of uniform-sized nanocrystals and related nanomaterials. We reported that uniform 2 nm iron oxide nanoclusters can be successfully used as T1 MRI contrast agent for high-resolution MR angiography of monkeys. We demonstrated that ceria-based nanoparticles can work as therapeutic antioxidants to treat various intractable diseases, including ischemic stroke, Alzheimer's disease, sepsis, and Parkinson's disease, and cardiovascular disease, and as radioprotectants. We synthesized MnFe₂O₄-anchored mesoporous silica nanoparticles to overcome hypoxia, and consequently enhancing the therapeutic efficiency of photodynamic therapy. We reported that MnFe₂O₄ and CeO₂ nanoparticle-anchored mesoporous silica nanoparticles can synergistically scavenge ROS and produce O₂ for rheumatoid arthritis treatment. We reported a heterogeneous chemodynamic therapy system based on copper-iron peroxide nanoparticles for tumor microenvironment-mediated synergistic therapy. We report a highly sensitive and selective K⁺ nanosensor that can quantitatively monitor extracellular K⁺ concentration changes in the brains of freely moving mice experiencing epileptic seizures.

We fabricated ultraflexible and/or stretchable soft-electronic and optoelectronic devices integrated with various functional nanomaterials and their applications to wearable and implantable medical and healthcare devices. We fabricated electrically conductive and elastic Ag&Au-based nanowire-rubber nanocomposites to treat cardiovascular diseases such as heart failure and ventricular tachyarrhythmia. We fabricated highly conductive and elastic nano-electrodes for their applications to healthcare and skin electronic devices. We synthesized a flexible/sticky electronic patch and an injectable hydrogel nanocomposite for controlled drug delivery for GBM treatment.

主讲人简介:

Taeghwan Hyeon is an SNU Distinguished Professor at Seoul National University and the 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 at Seoul National University in 1997, he has focused on the synthesis and applications of uniformly sized nanoparticles and related nanostructured materials and published > 400 papers in prominent international journals (> 74,000 citations and h-index of > 140). He was listed in "Top 100 Chemists" of the decade by UNESCO/IUPAC in 2011 and "Highly Cited Researcher" in both chemistry and materials science from 2014 to 2022 by Clarivate Analytics. His contribution to the field was recently highlighted by 2020 Citation Laureate in Chemistry. He received many awards including Korea S&T Award (2016, President's Science and Technology Award), Hoam Prize (2012, Samsung Hoam Foundation), POSCO-T. J. Park Award (2008), Grand Prize of National Academy of Engineering of Korea (2022), the IUVESTA Prize for Technology (2016, International Union for Vacuum Science, Technique and Applications), and the Kavli Foundation Frontiers of Materials Research Lecture from Materials Research Society (2023). From 2010 to 2020, he served as an *Associate Editor of the Journal of the American Chemical Society*. He is an editorial (advisory) board member of *ACS Central Science*, *Advanced Materials*, *Nano Today*, and *Small*.