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Nanomaterials synthesis using micro aerosols and potential applications in lithium ion battery

Professor Yiguang Ju

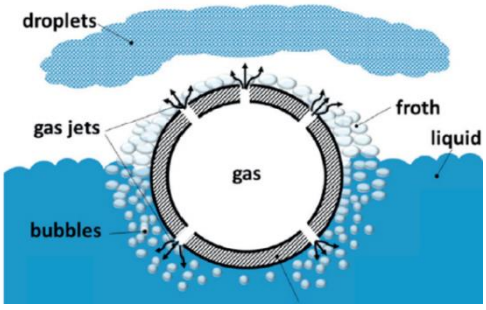
Princeton University

Date: Monday, 12 November. 2018, 15:00-16:00

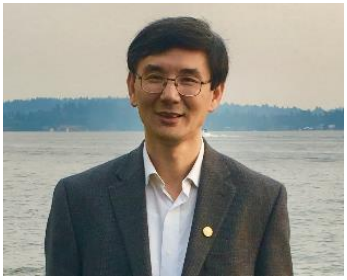
Venue: Faculty of Engineering Bldg. 2, 3F, 31A

Abstract:

This lecture reports the combustion synthesis of sub-100nm nanoparticles and the control of nanoparticle morphology using sub-micron aerosols. The distribution of droplet diameter and its correlation with physical properties of aerosol are discussed. The method is applied to synthesize rare-earth doped upconverting nanophosphors and lithium ion battery NCM cathode materials. The particle morphology as a function of synthesis temperature and droplet diameter is analyzed. Four different pathways to form ultrafine, solid, bimodal, and hollow particles, respectively, via the gas phase to particle, droplet to particle, a combined mode, and fast surface precipitation are presented. The luminesce properties and performance of battery test results will be discussed. The results showed that nanomaterials synthesis via well controlled aerosol droplet size and temperature control may play a great role in producing high performance EV batteries.



Biography:



Yiguang Ju is a Robert Porter Patterson Professor and the Director of Sustainable Energy Program at Princeton University. He received his bachelor degree from Tsinghua in 1986. Before he joined Princeton, he also taught at Tohoku University and Tsinghua University. Prof. Ju's research interests include combustion, propulsion, and sustainable energy. He has published more than 200 journal articles. He serves as the chair of the US Sections of Combustion Institute and a board member of the International Combustion Institute. He is a fellow of ASME and the Combustion Institute, and a distinguished visiting fellow of Royal Academy of Engineering, UK. He received many awards including the NASA Director's Certificate of Appreciation award and the Humboldt Foundation Bessel research award. He served as in the NASA committee for Rocket Study, National Academy of Science Committee for NASA microgravity research assessment, and a DOE committee for National Laboratories combustion program review.

主催: 東京大学大学院工学系研究科専攻間横断型教育プログラム 機械システム・イノベーション（GMSI）
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