

**Synthesis of Nano/Micro spheres and Development of Organic Solar Cells**

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This talk addresses two emerging technologies of nano/micro ZnO spheres and organic solar cells. The II-VI compound zinc oxide (ZnO) semiconductor is a smart and versatile material because of its wide range applications in technology. Due to their hexagonal structure, ZnO crystals tend to grow anisotropically in the form of nanorods, nanowires, and nanoflowers, where preferential *c*-axis oriented growth is dominant. Recently, ZnO spheres have attracted intensive attention for their properties and potential applications including photonic crystals, drug-delivery carriers, and sensors. The formation of ZnO spheres requires the absolute control of directional crystal plane where *c*-plane growth should be retarded and other growth planes should be enhanced to achieve symmetrical growth surfaces. A systematic investigation of the synthesis of ZnO solid spheres using structure directing agents will be discussed in terms of control of morphological changes, size, shape, and crystallinity of ZnO nanostructures. Second topic is to discuss organic photovoltaics that have the great potential for realizing flexible, easily-processible, and low-cost solar energy sources. Even though significant improvements in the performance of organic solar cells have been made, the recombination and degradation mechanisms of organic solar cells are not well understood. This talk discusses interfacial defect states in organic solar cells that led to different recombination paths, i.e. bimolecular (band-to-band), single, or coupled trap-assisted recombination processes. In addition, the degradation mechanisms of organic solar will be discussed. Finally, a modeling and simulation of organic polymers and fullerene morphologies that are randomly mixed to form nanoscale donor/acceptor interfaces will be discussed.

**Biographical Information:**

Dr. Gon Namkoong received his Ph.D. in the Department of Electrical and Computer Engineering at Georgia Institute of Technology in 2003. Currently, he is an associate professor at Old Dominion University. His principal interest is in the development of nitride-based materials and devices via integration technologies to overcome current device performance limitations allowing for new levels of multifunctional devices. He is also working on hybrid organic-inorganic solar cells using innovative nanotechnologies. He has authored/co-authored numerous research papers/presentations as well as technical reports, invention disclosures and patents. He is also actively serving an international journal, ISRN Renewable Energy as an editorial member.