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Aggregation-Induced Emission: Materials and Biomedical Applications

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Abstract

Recent years have witnessed the fast growth of fluorogens with aggregation-induced emission characteristics (AIEgens) in biomedical research. The weak emission of AIEgens as molecular species and their bright luminescence as nanoscopic aggregates distinguish them from conventional organic luminophores and inorganic nanoparticles, making them wonderful candidates for many high-tech applications. In this talk, we summarize our recent AIE work in the development of new fluorescent bioprobes for biosensing and imaging. The simple design and fluorescence turn-on feature of the molecular AIE bioprobes offer direct visualization of specific analytes and biological processes in aqueous media with higher sensitivity and better accuracy than traditional fluorescence probes. The AIE dot probes with different formulations and surface functionalities show advanced features over quantum dots and small molecule dyes in non-invasive cancer cell detection, long term cell tracing, and vascular imaging. In addition, our recent discovery that AIEgens with high brightness and efficient reactive oxygen species generation in the aggregate state further expand their applications in image-guided cancer surgery and therapy.

Biography

Professor Liu Bin received her B.S. degree from Nanjing University and Ph.D. degree from the National University of Singapore (NUS) before her postdoctoral training at the University of California, Santa Barbara. She joined the Department of Chemical and Biomolecular Engineering in NUS in 2005. She was promoted to Associate Professor in 2010 and was named as Chair Professor in 2014. Her current research focuses on organic nanomaterials for biomedical and energy applications. Professor Liu is one of the world's top 1% Highly Cited Researchers in Materials Science. She has received many prestigious awards, including the Singapore National Academy of Science Young Scientist Award 2008 and the President's Technology Award 2016. Professor Liu is a Fellow of the Singapore Academy of Engineering, Asia-Pacific Academy of Materials, Royal Society of Chemistry, and serves as the Associate Editor for Polymer Chemistry.