Triplet exciton emission in carbon nanodots

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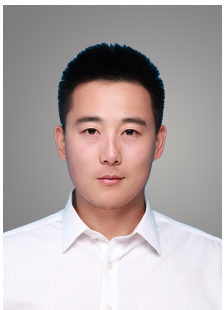
Emerging nano-luminescent materials represented by carbon nanodots have achieved significant progress in optoelectronic devices, bioimaging and therapy, luminescent inks, etc., due to their tunable optical properties, stability, and excellent biocompatibility. In this presentation, we mainly introduce the recent work of our research group in the field of triplet exciton luminescence in carbon nanodots. This includes achieving full-spectrum triplet exciton luminescence by manipulating the conjugated size of carbon nanodots; proposing a strategy of nanoscale spatial confinement to realize efficient and long-lived water-soluble phosphorescent carbon nanodots; and achieving energy transfer and modulation energy of triplet excitons through Fцrster resonance energy transfer. In terms of applications, high-energy photon sterilization, delayed imaging and luminescent devices, and X-ray imaging based on the triplet exciton emission were realized.



Short Bio:

Kai-Kai Liu received his Ph.D. degree from Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences in 2018. He received Yangtze River Scholar Award Program - Young Scholar in 2023, and he is currently a professor and doctoral supervisor at Zhengzhou University. He has long been engaged in the preparation and device research of carbon-based nanophotonic materials, and has made a series of progress in exploring luminescence mechanisms, spectral modulation, and expanding applications of triplet exciton emission. In the past five years, he has published more than 40 academic papers as first or corresponding author in journals such as Nature Communications, Advanced Materials, Light: Science & Applications, Nano Letters, etc.