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Biography

Tingchao He received his Ph.D. degree in Optics from Shanghai Jiao Tong University in June, 2010. After that, In July 2010-April 2014, he was a research fellow in Nanyang Technological University in Singapore. He joined the School of Physics and Energy of Shenzhen University in 2014, where he is now an associate Professor. His current research interests include nonlinear optical properties and ultrafast spectroscopic properties of various organic or inorganic materials. He has published over 60 papers in ACS Nano, Small, Adv. Opt. Mater., Appl. Phys. Lett., et al., and his papers have been cited more than 1000 times.

Presentation Title **Chiroptical Properties of Semiconductor QDs**

Chiral quantum dots (QDs) are expected to have a range of potential applications in biosensing, labeling, environmental nanoassays, chiral memory, building blocks for the bottomup nanofabrication of chiroptical devices and nanoassemblies, and fluorescent chiral nanoprobes in biomedical and analytical technologies[1,2]. We studied the chiroptical properties of colloidal solution of quantum dots (QDs) which were initially prepared with use of chiral ligands (diaminocyclohexane molecules). We demonstrate completely different circular dichroism (CD) activities of QDs capped with different amount of ligands. We consider that the chiroptical activity is caused by coupling between electric field of the chiral molecules and QDs in case of small amount of ligands. On the contrary, in case of excess amount of ligands, the chiral aggregate of diaminocyclohexane molecules is a significant contributor to the CD activities. Moreover, circularly polarized luminescence (CPL) of chiral QDs is discussed in details. Such optimized design and modulation of chiroptical properties will likely lead to novel applications in chiral biosensing and chiroptical nanomaterials.

References:

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2. U. Tohgha, K. K. Deol, A. G. Porter, S. G. Bartko, J. Kyu Choi, B. M. Leonard, K. Varga, J. Kubelka, G. Muller, M. Balaz, Ligand Induced Circular Dichroism and Circularly Polarized Luminescence in CdSe Quantum Dots, ACS Nano 7 (12), 11094–11102 (2013).