
Carbon dot luminophores

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Carbon dots (CDs) – small crystalline or amorphous carbon-based quasi-spherical nanoparticles – have recently attracted much attention as promising fluorescent materials. One of their widely accepted advantages is the simplicity of the formation of highly luminescent CDs from a wide variety of organic precursors. At the same time, several recent studies on these chemically synthesized CDs raised questions about the chemical nature of the resulting products; their strong luminescence can originate from the presence of molecular organic fluorophores. On the other hand, use of proper synthetic procedures yield purely carbon dot samples of different sizes; color-tunable fluorescence of CDs with blue, green, yellow, orange, red and even near-infrared emission can be achieved, with the color depending on size of the π -conjugated domains in the CD graphitic core. Recently, we have extended the family of these light-emitting colloidal carbon nanoparticles towards other shapes, such as nanorods with linearly polarized emission, nanobelts and nanorolls, and towards chiral carbon materials. Applications of CDs in luminescent solar concentrators and light-emitting diodes have been demonstrated.



Short Bio:

Andrey L. Rogach is a Chair Professor of Photonics Materials at the Department of Materials Science and Engineering, and the Founding Director of the Centre for Functional Photonics (CFP) at City University of Hong Kong, which he joined in 2009. He received his Ph.D. in Physical Chemistry (1995) from the Belarusian State University, and completed his habilitation in Experimental Physics (2009) at the University of Munich, Germany, on light emission and harvesting with semiconductor nanocrystals. His research focuses on synthesis, assembly and optical spectroscopy of colloidal semiconductor nanocrystals, and their use for energy-related and optoelectronic applications. He has been a Highly Cited Researcher (Clarivate Analytics) continuously since 2018, and a Foreign Member of the Academia Europaea.