Carbon dots – Novel Class of Efficient Luminophores

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Carbon dots (CDs) – small crystalline or amorphous carbon-based nanoparticles – have recently attracted much attention as promising fluorescent materials for a wide range of applications, both in the biomedical fields and in optoelectronics [1]. 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 nature of the resulting products [2]. Their strong fluorescence can arise due to the presence of molecular organic fluorophores, not necessary CDs, as was assumed in the earlier publications. On the other hand, purely carbon dot samples can be synthesized yielding CDs of different sizes; this synthetic approach has been demonstrated to be an effective way to tune their optical properties [3]. Color-tunable fluorescence of CDs with blue, green, yellow, orange, red and even near-infrared emission has been achieved, with the color depending on size of the π-conjugated domains in the CD graphitic core [4]. Very recently, we have extended the family of the light-emitting colloidal carbon nanoparticles towards carbon nanorods with linearly polarized emission [5].

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