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Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

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Sorted Carbon Nanotubes with Luminescent Defects for Optical and Electronic Applications

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Abstract

Polymer-wrapping has enabled the sorting and purification of large amounts of semiconducting and monochiral single-walled carbon nanotubes (SWNTs) that can be applied in a wide range of optoelectronic devices. Their near-infrared emission properties can be tuned either by intentional doping and non-covalent functionalization, or by the controlled introduction of luminescent sp3-defects. Furthermore, photoluminescence and electroluminescence spectra can provide information about charge transport in operating devices based on nanotube networks with and without defects. Here, I will give an overview of our recent progress on and insights into the targeted and controlled functionalization of polymer-wrapped semiconducting SWNTs and the resulting photophysics with regard to strong light-matter coupling, single-photon emission and electroluminescence.