

Fluorescent nanodiamonds: from the creation and characterization of optical defects to applications in biology

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Abstract:

Fluorescent nanodiamonds have unique physical, chemical and optical properties that make them highly attractive for applications from neuroimaging to quantum sensing. Many different types of fluorescent nanodiamonds exist: from HPHT nanodiamonds containing engineered fluorescent defects to detonation nanodiamonds that exhibit various forms of fluorescence depending on their processing. This presentation will focus on our recent progress in areas including the high-yield creation and characterization of nitrogen-vacancy centers in macroscopic and nanoscale HPHT diamond, the effect of surface chemistry and materials processing conditions on the fluorescence of detonation nanodiamonds and the use of fluorescent nanodiamonds in biological imaging applications. The importance of both single particle and ensemble characterization of carbon-based nanomaterials will be critically discussed.