

Magnetical and optical properties of nanodiamonds can be tuned by particles surface chemistry: Theoretical and experimental study

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Abstract

© 2014 American Chemical Society. In this paper, new steps toward a better understanding and utilization of high-pressure high-temperature nanodiamonds (NDs) containing nitrogen-vacancy (NV) centers have been taken. NV--related long-term luminescence of oxygenated particles increased in comparison to plasma hydrogenated NDs' NV- luminescence. The optically detected NV- electron spin resonance process can be also significantly affected by ND termination. For H-terminated ND particles the NV- to NV0 conversion energy is lower than the NV- excitation energy, so that the delocalized triplet electrons can be more easily released from the original positions and drawn to the electron-attracting localities in the material. The final result of this study was application of luminescent NDs in cells, showing the detectability of luminescent NDs in a standard confocal microscope and ND subcellular distribution in the cells by TEM.

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