Contribution ID : **92** Type : **not specified**

Quantitative 3D Strain Mapping in Nanodiamonds using Bragg Coherent Diffractive Imaging (BCDI)

Nanodiamonds (NDs) with nitrogen vacancy (N-V) centres have been shown to be useful for applications involving cellular tracking in vivo at the molecular level. The sustained fluorescence of these nanodiamonds is related to their structure, and is supposed to be influenced by the strain distribution inside the crystals. In nanocrystals even relatively small amounts of strain can induce large changes in the mechanical, optical and electronic properties of nanocrystals. The current work elaborates first application of Bragg coherent diffractive imaging (BCDI) for mapping the three-dimensional (3D) strain fields within the crystalline nanodiamonds. For reference, a control sample (as-grown crystls) has been compared with a strain-induced (implanted with 10E12 ions per cm2) sample. The comparison of control and strain-induced samples will help to optimise their application for tracking the processes at molecular level.

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