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

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Nanodiamonds with nitrogen vacancy (N-V) centres have been shown to be useful for applications involving cellular tracking in vivo at the molecular level[1]. 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 the present work, Bragg coherent diffractive imaging (BCDI) has been employed for three-dimensional (3D) strain mapping of single-crystal synthetic nanodiamonds dispersed onto a silicon substrate. Defects were introduced in these isolated nanodiamonds by implanting with 2 MeV protons to a dose of of 1015 H+ ions.cm-2 using a palletron accelerator1. The resulting strains were mapped using BCDI in order to characterise the 3D deformation field within the individual NDs.

[1] C.-C. Fu, H.-Y.Lee, K. Chen, T.-S.Lim, H.-Y.Wu, P.-K.Lin, P.-K.Wei, P.-H.Tsao, H.-C. Chang, W. Fann, Proceedings of the National Academy of Sciences, 104(3), p. 727-732, (2007)

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Summary

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