

Increasing the creation yield of shallow single defects in diamond by surface plasma treatment

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Single Nitrogen-Vacancy (NV) centers in diamond close to the crystal surface are very promising magnetic field sensors with very high sensitivity. Here we report the enhanced creation of very shallow NV centers (less than 3 nm) by using the proper plasma treatment. We observe a four fold increase - from 0.11 % to about 0.45 % in the production yield when the sample surface is terminated with fluorine or oxygen atoms. This effect is explained by the stabilization of the NV's negative charge state which is influenced by the various defects on the diamond surface.

Submitted: 09.09.2013

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