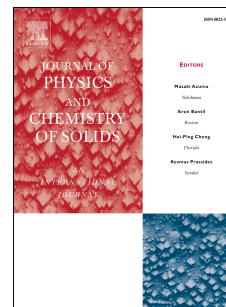


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A comparative study on finding an effective root for the introduction of Hydrogen into microplasma during diamond growth

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ABSTRACT

Nanodiamonds (NDs) have been synthesized by using microplasma facility. Ethanol is chosen as a Carbon precursor. A mixture of Ethanol and Argon has been dissociated in microplasma to fabricate NDs. In order to quench, etch and stabilize the NDs, Hydrogen has been used as a stabilizing agent. The motivation behind this project is to find an effective root for the introduction of Hydrogen into microplasma. The experiments are performed by introducing the Hydrogen either directly or indirectly into the microplasma. The results obtained from Raman, TEM and XRD confirmed that the highest quality (in terms of smallest size and near stress free) diamonds have been obtained in the case of indirect dilution. The decreased PL peak intensity with indirect dilution indicates the decreased defect density in the diamond. It is possible to produce and control the defect center only by controlling the Hydrogen introduction way in to the microplasma. The indirect dilution decreases the amount of Hydrogen bonded to trans-polyacetylene and enhances the Hydrogen termination to the surface of diamond grains.

Keywords

Nanodiamonds, Microplasma, defect center

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