

Possible Sulfur Induced Superconductivity in Nano-Diamond

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Abstract : We report on a possible occurrence of superconductivity in 5 nm particle size diamond powders treated with sulfur (S) at 500 °C for 10 hours in ~10⁻² Torr vacuum. Superconducting-like magnetization hysteresis loops M(H) have been measured up to ~ 50 K by means of the SQUID magnetometer (Quantum Design). Both X-ray (Θ -2 Θ geometry) and Raman spectroscopy analyses revealed no impurity or additional phases. Nevertheless, the measured Raman spectra are characteristic to the diamond with embedded disordered carbon and/or graphitic fragments suggesting a link to the previous reports of the local or surface superconductivity in graphite- and amorphous carbon-sulfur composites.

Keywords : nanodiamond, sulfur, superconductivity, Raman spectroscopy

Conference Title : ICDCMT 2015 : International Conference on Diamond, Carbon Materials and Technology

Conference Location : Zurich, Switzerland

Conference Dates : January 13-14, 2015