

Carbon dots decorated nanodiamond

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Although nanodiamonds produced by detonation synthesis (detonation nanodiamond (DND)) from carbon-containing explosives, have a low level of intrinsic photoluminescence (PL), for typical DND samples it is too weak to be useful for many applications. However, DNDs are inexpensive to produce in large quantities, so it would be advantageous to produce enhanced PL properties in DNDs. There are numerous approaches for synthesis of so called carbon dots, the luminescent graphite or amorphous carbon particles just a few nanometers in size. In the current work, we report how carbon dots decorated DND (Fig.1) can be produced from detonation soot demonstrating surprisingly strong photoluminescence of different colors depending on the conditions of treatment and the type of soot treated.

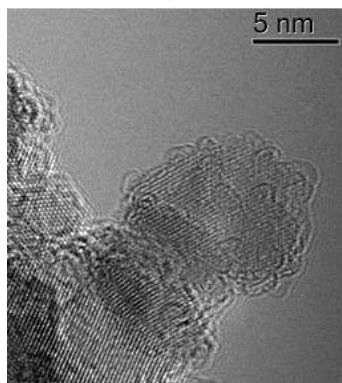


Figure 1. HRTEM of photoluminescent carbon dots decorated nanodiamond.

The PL spectra demonstrated a factor of more than 20 times enhancement of red luminescence in these samples as compared to typical DND from detonation synthesis. Mechanisms of formation of these hybrid structures will be discussed.

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- [2] M.G. Ivanov, S.V. Pavlyshko, D.M. Ivanov, I. Petrov, O. Shenderova, *JVST. B* **28**(4), 869 (2010).