

Experimental study of electric discharge treatment of nanodiamond particles in flow liquid

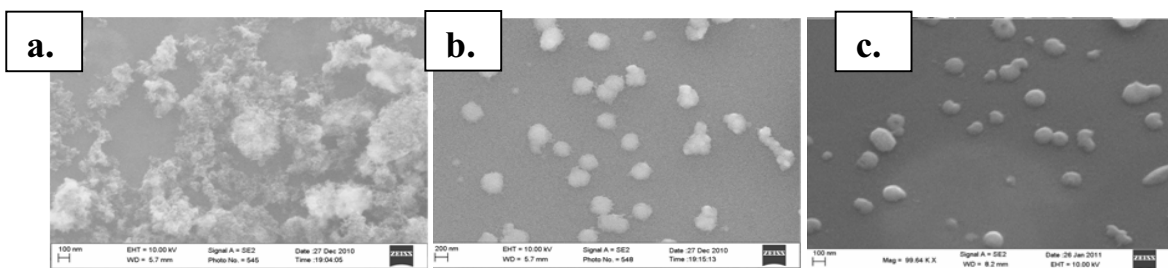
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Nanodiamonds as well as their suspensions have been widely used for several decades in machinery as lubricants, additives to oil and galvanic electrolytes. But nowadays carbon nanodiamonds are believed to have even more profound practical applications in biology and other industries[1]. In present article electric discharge treatment of nanodiamond particles has been studied.

In liquid phase pulsed electric discharge in water flow in Venturi tube was used for nanodiamonds treatment and functionalization [2].



Nanodiamond powder structure modification after treatment in suspension in water by pulse electric discharge in water flow.

- Before treatment- diamond crystals are completely covered by nondiamond carbon;
- Initial treatment - diamond conglomerates are separated from nondiamond carbon;
- Final treatment - diamond primary crystals are completely escaped from conglomerates;

Ordered self-organizing cubic superlattice formed by diamond nanocrystals escaped and functionalized by electric discharge treatment have been observed. The effect of reversible stretching of cubic superlattice formed by diamond nanoparticles by Van der Waals forces caused by electric charging have been observed.

- [1] K.B. Holt, *Philosophical Transactions of the Royal Society A* **365**, 2845 (2007).
- [2] D. Medvedev, V. Petyaev, D. Sapunov, B. Potapkin, S. Korobtsev, Experimental study of electric discharge treatment of nanodiamond particles in liquid and gas phases, ISPlasma 2011, Nagoya, Japan, p. 211