DETONATION NANODIAMOND : PURIFICATION AND MODIFICATION

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Increasingly growing interest to nanomaterials becomes the dominant tendency, including the field of fundamental research in physical chemistry. It looks, that the detonation nanodiamond (ND) will be promising object for scientific research, which results can find both expected, and new, beforehand unpredictable, areas of practical use. In ND owing to the rather small average size of particles (4.2 nm) the fraction of superficial atoms can be up to 15 %. The total contents of oxygen, hydrogen and nitrogen in ND exceeds 10 at. %. Therefore role of chemistry and physical chemistry of surface phenomena at research of cleaning, modification and application of ND should be decisive.

The purpose of this work consists in performance of comprehensive research including purposeful cleaning of the ND, modification of ND's surface termination, research of its defective structure, and hydrophility investigation of ND powders at various conditions.

Backed in pure Ar samples is rather fast (within one hour and more) repair initial weight in laboratory atmosphere. However samples, backed in CCl_4 flow, demonstrate essential difference. First, the loss of weight is less that observable in the same temperature conditions in pure Ar flow. Secondly, the sample practically does not absorb water vapor from air. The similar serious hydrophobisation was obtained after NH_3 high-temperature modification of the ND. One of benefit of latter treatment is serious deminishig of oxygen content in the ND.

Remarkable features of modified ND was revealed by ESR-, FTIR-, and Raman-spectroscopies.

To summarize, it is found and investigated rather simple and effective methods of the ND cleaning and modification.