

ROUND DIAMOND NANOPARTICLES

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Abstract

Nanodiamonds (NDs) are highly promising material for biomedical research due to their outstanding optical and magnetic properties and low toxicity. We developed a complex route to the bioapplicable fluorescent nanodiamond particles, including boosting of NDs fluorescence, shaping the particles to become pseudospherical and coating the particles with antifouling and modifiable polymeric shell. [1, 2] Starting material used in our work is prepared under high pressure-high temperature (HPHT) conditions, particles are polydisperse and of irregular shape bearing sharp edges and spiky vertexes. Recent research of cellular fate of diamond nanoparticles has revealed that behaviour of the original angular particles differs from that of rounded NDs. [3]

Here we present a procedure of rounding of NDs at a large scale and a study of rounded NDs properties. The rounding process is based on chemical etching of rough ND particles in molten potassium nitrate and results in pseudospherical NDs with changed particle size distribution. Our study shows dependence of round NDs behaviour, shape and size distribution on etching conditions and compares the results with angular NDs. Round NDs can be easily further processed to create fluorescent and polymer-coated round NDs, unique material perfectly suitable for bioprobes and sensors construction.

Keywords: Nanodiamond, nanoparticle, shape

REFERENCES:

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