Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Synthesis of nanodiamonds and diamondoids by dielectric barrier discharges generated in supercritical xenon SVEN STAUSS, HIROYUKI MIYAZOE, TOMOKI SHIZUNO, KOYA SAITO, Department of Advanced Materials Science, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8561 Japan, TAKEHIKO SASAKI, Department of Complexity Science and Engineering, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8561 Japan, KAZUO TERASHIMA, Department of Advanced Materials Science, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8561 Japan — Nanodiamond and diamondoids were synthesized by dielectric barrier discharge plasmas (applied voltage $\sim 2-8\,\mathrm{kV_{p-p}}$, frequency $5-10\,\mathrm{kHz}$) generated in supercritical xenon close to the critical point ($T_{\mathrm{crit}} = 289.7\,\mathrm{K}$, $p_{\mathrm{crit}} = 5.84\,\mathrm{MPa}$), using adamantane as a precursor. The synthesized materials were characterized by micro-Raman spectroscopy, which permitted to confirm the presence of sp^3 hybridized bonds. Matrix assisted laser desorption ionization mass spectrometry and gas chromatography - mass spectrometry were used to identify the synthesized materials. The most frequent peaks were those that could be attributed to hexamantane ($C_{4n+6}H_{4n+12}$, $n = 6$), but also peaks that could be attributed to other higher order diamondoids consisting of $n = 2-15$ of fused adamantane cages.

Sven Stauss
Department of Advanced Materials Science, The University of Tokyo,
5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8561 Japan

Date submitted: 14 Jun 2010 Electronic form version 1.4