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Chemical vapor deposition of nanodiamonds and study of their structural, optical, and electronic properties RAJARSHI CHAKRABORTY, KYLE LA ROQUE, SURESH SHARMA, University of Texas at Arlington — Diamond thin films were grown on silicon substrates by hot-filament assisted chemical vapor deposition technique utilizing CH_4 and H_2 mixtures. During our investigations of diamond thin films in the 1990's, the emphasis was on the growth of continuous thin diamond films with exceptional structural, electronic, and electrical properties [1]. However, there is now renewed interest in the growth and unique properties of nanometer-size diamond [2]. We have, therefore, re-examined some of our previously grown diamond samples with emphasis on delineating the structural and optical properties of nanometer-size diamond particles in these samples. The nanoparticles are characterized by using AFM, SEM, XPS, and Raman spectroscopy. The optical properties of the nanoparticles are further studied by carrying out photoluminescence measurements. In this contribution, we briefly review different growth techniques and present our results on the structure and optical properties of nanodiamonds.

[1] S. C. Sharma et al., J. Materials Research, **5**, 2424 (1990)

[1] J. P. Boudou et al., Nanotechnology, **20**, 235602 (2009)

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