Influence of the growing parameters on the size distribution of PbTe nanoparticles produced by laser ablation under inert gas atmosphere (Conference Paper)

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Abstract

We report the fabrication of PbTe quantum dots grown under inert gas (Ar and He) atmosphere by pulsed laser deposition using the second harmonic of a Q-Switched Quantel Nd:YAG laser. For characterization, samples were prepared onto a 40Å carbon film deposited on a copper grid. The influence of background pressure, and number of laser pulses on the size distribution of the PbTe nanoparticles was investigated by transmission electron microscopy using a 200 kV TECNAI G2 F20 electron microscope with 0.27 nm point resolution. The size distribution was obtained by manually outlining the particles from several dozens of low- and high-resolution TEM images. Once digitized and saved in a proper format, the image was processed using the J-image software. Characterizations reveal an increase of the nanoparticle size both with the amount of material deposited (number of laser pulses) and the background pressure. Furthermore, measurements reveal a narrower nanoparticle size distribution by increasing the number of laser pulses or by decreasing the background pressure. HRTEM studies of the influence of different ambient gases on the structural properties of the PbTe nanoparticles are being conducted.

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