

# Characterization of Boron Nanoparticles Synthesized with a Thermal Plasma System

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In the current work, we demonstrate the gas phase plasma synthesis of ultrafine boron nanoparticles by decomposing boron trichloride ( $\text{BCl}_3$ ) gas in an argon-hydrogen thermal plasma and quenching the hot plasma by expansion through a ceramic nozzle, driving the homogeneous nucleation of nanoparticles. It is shown that ultrafine nanoparticles can be produced from the experiments. We also show the characterization results regarding the oxidation of boron nanoparticles at room temperature using X-ray Photoelectron Spectroscopy (XPS) and the combined Scanning Transmission Electron Microscope (STEM) and Electron Energy Loss Spectroscopy (EELS).

**Keywords:** Thermal plasma, nucleation, boron nanoparticles, TEM, XPS

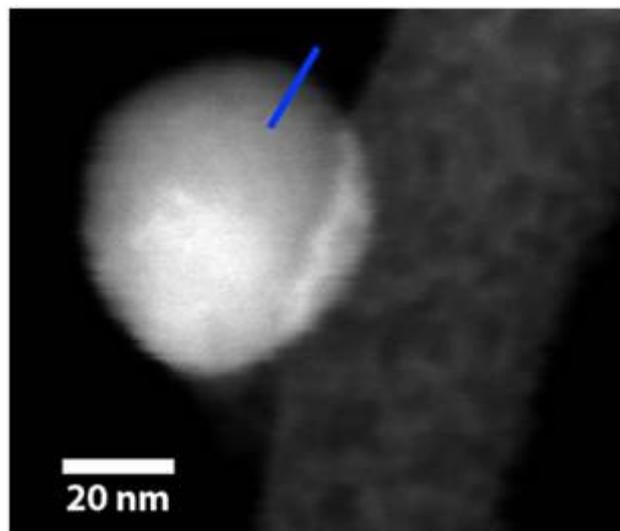


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