

Abstract Submitted
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Plasma in the Synthesis of Nanoparticles TAYLOR LAUB, CHARLES GENTILE, YEVGENY RAITSES, PPPL — Development of nanotechnology, specifically the production of carbon nanotubes, may be integral to innovation in an array of fields, from textiles to electronics. The structure of carbon nanotubes affords for the creation of materials with exceptional strength and conductivity. At present, scientists rely on “cut-and-try” methods to perfect the plasma synthesis, leaving an interface gap between plasma and material sciences. As a result, methods of producing carbon nanotubes are expensive and length is difficult to standardize. Therefore, the development of a method to produce carbon nanotubes efficiently and in uniform sizes is of great interest. To elucidate the role of plasma in the synthesis of nanoparticles, Princeton Plasma Physics Lab is developing a Plasma-Based Nano Laboratory (PBNL). The PBNL houses an Electron Diffusion Gauge Experiment (EDGE) as well as a Nanotube Arc Discharge Experiment (NADE) with the purpose of investigating plasma-nanoparticle interaction. The NADE studies the ability to control the diameter and length of nanotube formation through a set of experimental parameters. In addition, the potential to increase nanotube length will be studied. PPPL’s expertise on plasma science could be critically valuable to the successful development of highly efficient and low cost plasma-based techniques, which have the potential to increase accessibility of nanotubes, and propel further innovation rooted in nanotechnology.

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