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# Formation and control of nanoparticle growth in RF produced Argon plasma

Formation of nanoparticle has strong industrial application where controlling the size and morphology of these particles are necessary. A proper control on these parameters is quite challenging and of recent interest of research [1]. In this presentation, an experiment on nanoparticle growth in highly magnetized argon-acetylene plasma is presented. In these studies, the magnetic field alters the plasma dynamics and at very high magnetic field (B > 1 T) a 'filamentary structure' (which is a distinct, localized regions within a plasma that appears brighter than the surrounding plasma and that extends parallel to the magnetic field lines) forms in between the electrode. It is found that the nanoparticles grown in the plasma can act as a "sink" for the filamentary structure leading to them being suppressed [2]. Simultaneously, particles grown in these filamentary structures significantly affect the particles morphology. There is a threshold found in the magnetic field below which the growth cycle gets faster and above that magnetic field the growth cycle gets slower and after 1.5 T there is no growth cycle observed. Increasing magnetic field also decreases the size of nanoaparticles. This presentation also reports the ex-situ analysis of the properties of grown nanoparticles.

References:

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2. L. Couëdel, D. Artis, M. P. Khanal, C. Pardanaud, S. Coussan, S. LeBlanc, T. Hall, E. Thomas Jr, U. Konopka, M. Park and C. Arnas, "Influence of magnetic field strength on nanoparticle growth in a capacitively-coupled radio-frequency Ar/C2H2 discharge", Plasma Res. Express 1 (2019) 015012.