

Seminar

Institute for Plasma Research

- Title:** Studies on nanoparticles' formation in liquid and gaseous media
- Speaker:** Dr. Prachi B. Orpe
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- Date:** 17th November 2022 (Thursday)
- Time:** 03:00 PM
- Venue:** Seminar Hall, IPR

Abstract

For the past few decades, the thermal plasma process has evolved as an important technique for the synthesis of various nanomaterials due to huge advantages over other routes. Researchers have shown keen interest in developing new process parameters and environments during this high temperature plasma process with the aim to obtain nanomaterials with desired morphological and other properties.

In the present work, a study has been carried out with the aim to obtain metal nanoparticles with narrow size and size distribution. In order to achieve this objective the arc plasma process was carried out under two different processes: In the first case we carried out the arc discharge within a liquid medium with the aim of faster quenching and consequently narrower size distribution. Under this study, four different liquid media variables were studied and at different plasma currents. The liquids mediums studied were water with and without NaCl additives of different molarities. For each of this liquid arc current were varied from 30 A to 70 A. Material studied was aluminium (Al). The results obtained with respect of various phase formations as well as metallic nanoparticle formation will be presented in the talk.

In the second set of study, arc plasma was done in gaseous (air) media. However, the arcing was done with few times momentary (1 sec.) arcs separated by few second gaps. This was done with the aim of decreasing the total vapour flux emanating and thereby reducing the growth of clusters. Here too experiments were done for currents varied from 10 A to 20 A. Low melting point Tin (Sn) was chosen for this study. The size and size distribution obtained from this study will be presented.
