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# Seminar

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## Institute for Plasma Research

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**Title:** Ion Implantation of Al and its Alloys and its Characterization

**Speaker:** Dr. Razia Nongjai  
Institute for Plasma Research, Gandhinagar

**Date:** 1<sup>st</sup> March 2023 (Wednesday)

**Time:** 03.30 PM

**Venue:** Join the talk Online:

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### Abstract

Study of Aluminium and its alloys are of great importance since the usages of this materials in automotive industry have grown rapidly, due to the attempt of reduction of the total weight of automotive. However, their poor mechanical surface properties, i.e. low hardness and high wear limit their applications. These properties can be improved by creating a case-hardened surface by a process known as nitriding in which nitrogen is introduced into the surface. Conventional techniques such as nitriding have been carried out but with limited success because of very low diffusion coefficient of nitrogen in Al. In this work, we focused on the creation of case-hardened AlN on the surface aluminium and some of its alloy like 6063AA by nitrogen ion implantation.

In the present work, nitrogen ion has been implanted in pure aluminium and 6063 AA by conventional ion implantation using 30 KV tabletop accelerator housed at Inter University Accelerator Centre, New Delhi. The pristine and the implanted samples are characterized by XRD and AFM for phase identification and surface morphological analysis. The AlN formation is appeared in nitrogen ion implanted pure aluminium sample in the XRD diffraction pattern. From the surface morphological analysis, it is observed that the average roughness of both aluminium and 6063 AA increases after the implantations. The detail information of AlN formation can be obtained from the cross-sectional elemental analysis. The cross-sectional morphology and elemental composition characterization is under process. This result will be compared with nitrogen ion implantation by plasma immersion ion implantation.

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