

Seminar

Institute for Plasma Research

Title: A comparative study of LIBS signals for untextured and laser induced textured brass sample

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Date: 10th July 2024 (Wednesday)

Time: 03:00 PM

Venue: Committee Room 4, IPR

Abstract

Laser-induced breakdown spectroscopy (LIBS) is a novel technique to analyze the constituent elements of the material using an atomic emission spectrometry. The significant benefits of LIBS are its rapidity, capability to analyze multi-elements in a single shot and simplicity in data interpretation. Though, the LIBS technique is rapidly developed and widely applied, still its applicability is limited by weak spectral sensitivity. In this regard, an effective method has been proposed to increase the spectral intensity of laser produced plasma in context of its implication in laser induced breakdown spectroscopy (LIBS) by generating the micro/nanostructures on the ablating surface. An Nd: YAG laser (1064 nm, FWHM 6 ns) has been used to generate large area micro/nanostructures on the brass surface. Different processing parameters, that is laser and scanning parameters are utilized to optimize the morphological conditions of the target surface for improving the sensitivity of LIBS signal. SEM and AFM images are used to characterize the morphology of the ablating surface. It has been observed that there are large differences in the emission intensity of plasma species produced with untextured and textured surface. In case of textured surface, spectral intensity of constituent species enhanced by 2 to 3 times in comparison to observed intensity with untextured surface. Further, some additional lines emitted from the trace elements present in the brass are appeared remarkably in textured surface which are not evident in untextured surface. The plausible role of surface morphology and subsequent changes in optical properties and plasma parameters in the observed results are also discussed.
