Seminar

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Institute for Plasma Research

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Title:	Effects of radiation on Ceramic Composite: Activation Analysis and structural stability
Speaker:	Dr. Prashant Sharma ITER-India, Gandhinagar
Date:	06th December 2024 (Friday)
Time:	02:00 PM
Venue:	Seminar Hall, IPR

Abstract

Alumina is widely used in reactor applications considering its exceptional electrical and mechanical properties. To improve the performance of Alumina in high-energy radiation environment, Al_2O_3-YSZ composites were prepared with 60:40 and 80:20 compositions using the powder metallurgy route. The consolidated pellets were obtained after sintering at 1400°C for 4 hours.

The effects of 14 MeV neutron irradiation (fluence: $1x10^{13}$ n/cm^2) on the Structural stability of pure material and their composites are studied. This study reveals that the phase transformation of Al_2O_3 was suppressed in composites post-irradiation and structural stability improved. Additionally, we examined the neutron-induced activation and transmutation of elements for experimental irradiation parameters using the ACTYS code and correlated with obtained gamma spectroscopy results. This study provides an assessment of structural stability of Al_2O_3-YSZ composites as well as its radiation-induced activation, which are relevant for nuclear and other high-radiation environments. The talk will cover the obtained results and future perspectives.