

Seminar

Institute for Plasma Research

Title : Radiation-induced structural modifications and radiation tolerance in pyrochlore oxides

Speaker: Dr. Asha Panghal

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Date : 24th June 2022 (Friday)

Time : 03.30 PM

Venue : Online - Join the talk:

https://lobby.ipr.res.in/Dr.Asha_PDFTalk

Abstract :

Materials for use in hostile conditions, such as nuclear reactors or the immobilization of radioactive waste, must have exceptionally high radiation resistance, such as very low volume swelling or amorphization. In recent years, there has been a lot of study towards finding radiation-tolerant materials for advanced nuclear fuel forms or nuclear power reactors. Amorphization, interstitial point-defect clustering, cavity due to vacancy, and associated swelling and formation of new phases are few examples of unfavorable radiation-induced processes.

Isometric pyrochlore oxides ($A_2B_2O_7$) have been reported for use in hostile environments such as nuclear reactors or waste immobilization because of their high durability and special resistance to radiation damage effects. The zirconate pyrochlore oxides, which belong to the pyrochlore family, meet these requirements; extensive research has been done in recent years to find radiation-tolerant ceramics and the properties that promote radiation tolerance. We'll focus on oxides having structures that are similar to the fluorite crystal structure. In particular, the ion irradiation-induced structural modifications, i.e., lattice swelling, amorphization, and pyrochlore to fluorite phase transformation of $La_2Zr_2O_7$ and $Gd_2Zr_2O_7$ pyrochlore oxides have been investigated for possible applications in a hostile environment.
