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Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3) Departament Badań Układów Złożonych (DUZ)

Wtorek: **07.12.2021**
11:30

Zuzanna Krajewska

The p-TRISO samples preparation for the experiment of ion implantation - why this "easy" step is in fact time-consuming?

Abstract:

The investigations of the coated-particles of nuclear fuel samples are carried out in three stages: front-end, irradiation in the reactor core, and post-irradiation examination. The front-end stage is the initial analysis of the failures rates of produced TRISO samples before they are placed in the reactor core. The purpose of the verification is to prepare the p-TRISO particles (named as BISO particles predecessors to TRISO) for an experiment that will determine the degree of damage to the coated particles at each stage. Before starting experiments with the samples, they must be properly prepared. Polishing the samples in order to uncover the inner layers is an important, initial experimental step. Mechanical polishing used frequently for sample preparations generates additional mechanical damages in the studied fuel particle, thus directly affecting the experimental results. An alternative solution seems to be the ion polishing method. This presentation focuses on comparing the two polishing methods using diagnostic methods such as Raman spectroscopy, scanning electron microscopy, and confocal laser scanning microscopy. Based on the obtained results, it was concluded that the ion polishing method is better because the level of interference with the structures of the individual layers of the tested samples is much lower than with the mechanical method. Although each of these polishing methods can be used for sample preparation, additional arguments in favour of using an ion polishing method are the possibility of using constant parameters, repeatability (reliability) of results, and shorter lead time; which as such, interferes less with the structure of the tested material.

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