

## SWIFT HEAVY ION IRRADIATION-INDUCED CHANGES IN MECHANICAL PROPERTIES OF Si<sub>3</sub>N<sub>4</sub>

*Friday, 13 November 2020 15:00 (15 minutes)*

Silicon nitride is one of the perspective ceramics for inert matrix fuel hosts to be used for transmutation of minor actinides. Such materials should have structural stability and appropriate mechanical properties being irradiating with neutrons,  $\alpha$ -particles and fission products.

In this work we report on mechanical properties of polycrystalline Si<sub>3</sub>N<sub>4</sub> irradiated with swift heavy ions simulating fission fragment impact. The samples were bombarded with 167 MeV Xe, 220 MeV Xe, 46 MeV Ar, 107 MeV Kr and 710 MeV Bi to fluences ranged from  $6 \times 10^{11}$  to  $5 \times 10^{14}$  cm<sup>-2</sup> and examined using nanoindentation technique. It has been found that radiation-induced changes in material hardness are strongly dependent on defect structure formed via relaxation of dense electronic excitation, i.e. accumulation and overlapping amorphous track regions.

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