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## Investigation of Thermal Neutron Radiation Shielding Features of B<sub>2</sub>O<sub>3</sub> and Gd<sub>2</sub>O<sub>3</sub>-doped Materials (Quartz, Glasses, Al, W) by Using MCNP6.2

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In this study, the total macroscopic cross sections of thermal and fast neutron interactions with quartz, glass, and some elements such as Al, W, stainless steel doped with B<sub>2</sub>O<sub>3</sub> and Gd<sub>2</sub>O<sub>3</sub> were computed by using Monte Carlo N-Particle Code (MCNP6.2). Also, the macroscopic effective removal cross-sections of fast neutron interactions were theoretically calculated based on the mass removal cross-section values for various elements in materials and additives. The results show that the highest value for both thermal neutron total macroscopic cross-section and fast neutron total macroscopic cross-section were obtained with Gd<sub>2</sub>O<sub>3</sub> doped glass. Besides, Gd<sub>2</sub>O<sub>3</sub> doping gives the highest fast neutron total macroscopic cross-section among all additives. The results of this study provide a good understanding of the shielding properties of Quartz, glass, and some other elements such as Al, W, stainless steel, doped with B<sub>2</sub>O<sub>3</sub> and Gd<sub>2</sub>O<sub>3</sub> for thermal and fast neutrons.

### In-person participation

No

**Primary authors:** BAT, Ayşe (Erciyes University); Dr TIRAS, Emrah; KAMISLIOGLU, Mirac (Bandırma Onyedi Eylül University)

**Presenter:** KAMISLIOGLU, Mirac (Bandırma Onyedi Eylül University)

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