

# **Gamma Radiation Spectrum Analysis of Irradiated Fuel at Different Cooling Times and the Best Fuel Burnup and Power Monitors in Tehran Research Reactor**

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## **Abstract**

One of the non-destructive methods in evaluating the characteristics of irradiated fuels in any reactor is the gamma radiation spectroscopy. Qualitative and quantitative analyses of the spectrum of an irradiated fuel and the estimation of some fissile products as a fuel burnup and the power peaking factor monitors in a fuel assembly are necessary. On the other hand, some experimental constraints, including the resolution of the detector energy, prevent the detection of some fission products and hide certain information in the spectrum. Therefore, in this study, the content of fissile fragments of Tehran Research Reactor fuel at different cooling times (3, 30, 120, 360 and 720 days) was evaluated with the ORIGEN2.1 computational code and the spectrum of fission products by Monte Carlo code MCNPX2.7 has been simulated. Then fission products that can be considered as good monitors of fuel burnup have been analyzed.

**Keywords:** Gamma radiation spectrum, Irradiated Fuel, Fuel burnup, Tehran Research Reactor.

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