

THE DETERMINATION OF THE NEUTRON FLUX DISTRIBUTION BY Zr
ACTIVATION DETECTORS

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A good knowledge of the neutron flux distribution over the core of a nuclear reactor is necessary for power distribution calculations and for the prediction of local burning rate of fuel elements. For a research reactor the thermal and epithermal flux data must be used for various experiments and for the isotope production.

The neutron flux measurements are most reliable done by activation detectors. However in high flux reactors ($\phi = 10^{14}$ n cm⁻²s⁻¹) there are some problems (self absorption, flux depression etc.) when working with common (usually high σ) activation detectors. Therefore the flux measurements in the reactor RA in Vinča were done with (low σ) Zr activation detectors. Besides several ^{1,2} experimental advantages, the flux determination with these detectors is based on accurately measured ³ nuclear data, and enables simple and accurate simultaneous thermal and epithermal flux measurement. The thermal and epithermal flux distribution is measured in 5 irradiation channels at 4 various reactor powers (0.05, 0.5, 1.0, 1.5 MW) during the reactor test runs. The gamma activity results obtained, were analysed in the framework of the simple Hogdal ⁴ convention. This analysis usually yielded the thermal and epithermal flux values with 4-5% overall uncertainty.

The results of the thermal and epithermal flux measurements are presented on Fig.1 and Fig.2 respectively.

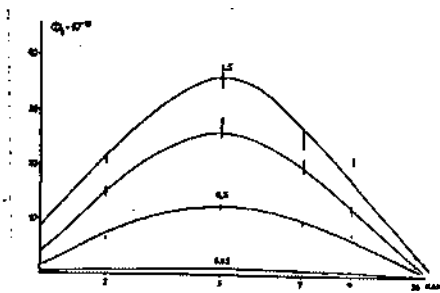


Fig. 1.

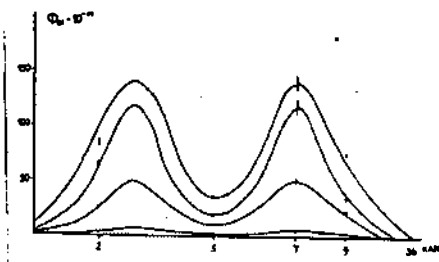


Fig. 2.

REFERENCES:

- 1) A. Simonits et al. : *J. Radioanal. Chem.* 31 (1976) 467
- 2) L. Marinkov et al. : *Fizika* 11, suppl. 1 (1979) 209
- 3) F. De Corte et al. : *J. Radioanal. Chem.* 62 (1981) 209