

Experimental setup for elemental analysis using prompt gamma rays at research reactor IBR-2

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Abstract

The new experimental setup has been built at the 11b channel of the IBR-2 research reactor at FLNP, JINR, to study the elemental composition of samples by registration of prompt gamma emission during thermal neutron capture. The setup consists of a curved mirror neutron guide and a radiation-resistant HPGe high-purity germanium detector. The detector is surrounded by lead shielding to suppress background gamma level. The sample is placed in a vacuum channel and surrounded by a LiF shield to suppress the background generated by scattered neutrons. This work presents the diagram and characteristics of the experimental setup. An example of hydrogen concentration determining in diamond powder of detonation synthesis is given and on its basis, the sensitivity of the setup is calculated.