

Double Layer Collimator for BNCT Neutron Source Based on 30 MeV Cyclotron

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Author Order	of
Accreditation	
Abstract	<p>A research of design of double layer collimator using $^9\text{Be}(p,n)$ neutron source has been conducted. The research objective is to design a double layer collimator to obtain neutron sources that are compliant with the IAEA standards. The approach to the design of double layer collimator used the MCNPX code. From the research, it was found that the optimum dimensions of a beryllium target are 0.01 mm in length and 9.5 cm in radius. Collimator consists of a D₂O and Al moderator, Pb and Ni as a reflector, and Cd and Fe as a thermal and fast neutron filter. The gamma filter used Bi and Pb. The quality neutron beams emitted from the double layer collimator is specified by five parameters: epithermal neutron flux $1 \times 10^9 \text{ n/cm}^2\text{s}$; fast neutron dose per epithermal neutron flux $5 \times 10^{13} \text{ Gy cm}^2\text{s}$; gamma dose per epithermal neutron flux $1 \times 10^{13} \text{ Gy cm}^2\text{s}$; ratio of the thermal neutron flux of epithermal neutron flux 0; and the ratio of epithermal neutron current to total epithermal neutron 0.54.</p>
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