Physics 6

Lithium target: manufacturing and operation

Evgeniia Sokolova[1,2], Marina Bikchurina[1,2], Dmitrii Kasatov[1,2], Timofey Bykov[1,2], Sergey Taskaev[1,2]

[1]Budker Institute of Nuclear Physics, Siberian Branch, Russian Academy of Sciences, Novosibirsk, Russia

[2]Novosibirsk State University, Novosibirsk, Russia

*Corresponding Author: buiya@bk.ru

Background/Objective: The lithium target provides the best neutron beam quality for BNCT: high neutron yield at a lower proton energy, soft low-energy neutron spectrum, less neutron moderation, and lower neutron losses during moderation. However, it has some features that must be taken into account: low melting point, poor thermal conductivity and high chemical activity of lithium, as well as production of radioactive beryllium-7.

Results: Accelerator based neutron source VITA, which includes the lithium target for neutron generation, has been proposed and developed at the Budker Institute of Nuclear Physics (BINP). The lithium target provides stable, long-term neutron generation with an epithermal neutron flux in the ^{7}Li(p,n)^{7}Be reaction, which fully meets the IAEA neutron beam recommendations for BNCT.

Conclusion: The report describes the manufacturing, quality control, performance, and operation of the VITA lithium target.

Keywords: Lithium target; Accelerator-based neutron source