VITA neutron source for BNCT – Status and Prospects

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At BINP (Novosibirsk, Russia) the epithermal neutron source based on the Vacuum Insulated Tandem Accelerator (VITA) is constructed and put into operation. The generation of neutrons is carried out using ^{7}Li(*p*,*n*)^{7}Be reaction [1]. The parameters of the generated neutron flux allow us to carry out *in vitro* and *in vivo* experiments for BNCT.
During last years we tested and confirmed all ideas initially proposed for the facility. Steady state current transported through the accelerator system can rich 2.5 mA. Proton energy reached 2 MeV. Investigations of the neutron spectrum and spatial distribution dose rate as well as preliminary *in vitro* biological experiments were carried out.
The neutron beam shaping assembly is designed. That assembly makes possible to provide a higher neutron dose to the patient: 0.3 Sv/min per 1 mA at 2.5 MeV beam energy [2]. It is already possible to get a minimal required neutron flux using this beam shaping assembly with the obtained proton beam.
To the present moment all the reasons that limit the accelerator current are investigated and several approaches to increase the current are proposed. The first approach is to avoid the influence of the stripping gas to the accelerator electrodes. The second approach is to use a new negative hydrogen ion source. New source is now under construction and it will allow us to obtain 10 mA of proton current which is acceptable for BNCT in clinic.

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[2] E. Kashaeva, G. Malyshkin, S. Samarina, S. Taskaev. Regimes of therapeutic beam shaping from an accelerator neutron source. Abstracts of the 15th International Congress on Neutron Capture Therapy, 10-14 September 2012, Tsukuba, Japan, p. 138-139.