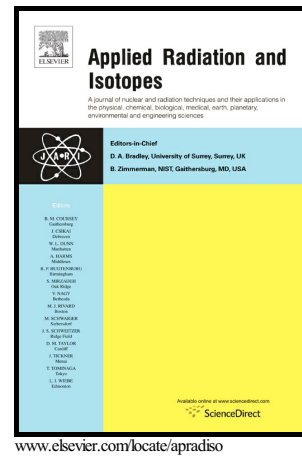


Author's Accepted Manuscript

Development of beryllium-based neutron target system with three-layer structure for accelerator-based neutron source for boron neutron capture therapy

Hiroaki Kumada, Toshikazu Kurihara, Masakazu Yoshioka, Hitoshi Kobayashi, Hiroshi Matsumoto, Tomei Sugano, Hideyuki Sakurai, Takeji Sakae, Akira Matsumura



PII: S0969-8043(15)30115-9
DOI: <http://dx.doi.org/10.1016/j.apradiso.2015.07.033>
Reference: ARI7062

To appear in: *Applied Radiation and Isotopes*

Received date: 6 February 2015
Revised date: 11 June 2015
Accepted date: 25 July 2015

Cite this article as: Hiroaki Kumada, Toshikazu Kurihara, Masakazu Yoshioka, Hitoshi Kobayashi, Hiroshi Matsumoto, Tomei Sugano, Hideyuki Sakurai, Takeji Sakae and Akira Matsumura, Development of beryllium-based neutron target system with three-layer structure for accelerator-based neutron source for boron neutron capture therapy, *Applied Radiation and Isotopes* <http://dx.doi.org/10.1016/j.apradiso.2015.07.033>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Development of beryllium-based neutron target system with three-layer structure for accelerator-based neutron source for boron neutron capture therapy

Hiroaki Kumada^{a,*}, Toshikazu Kurihara^b, Masakazu Yoshioka^b, Hitoshi Kobayashi^b, Hiroshi Matsumoto^b, Tomei Sugano^c, Hideyuki Sakurai^a, Takeji Sakae^a, Akira Matsumura^a

^a Faculty of Medicine, University of Tsukuba, Tsukuba, Ibaraki 305-8575, Japan

^b High Energy Accelerator Research Organization, Tsukuba, Ibaraki 305-0801, Japan

^c Mitsubishi Heavy Industry Ltd., Mihara, Hiroshima 729-0393, Japan

Corresponding Author:

Hiroaki Kumada

Faculty of Medicine, University of Tsukuba

1-1-1, Tennodai, Tsukuba, Ibaraki, 305-8575, Japan

Phone: +81(29)853-7117

Fax: +81(29)853-7103

E-mail: kumada@pmrc.tsukuba.ac.jp

Abstract

The iBNCT project team with University of Tsukuba is developing an accelerator-based neutron source. Regarding neutron target material, our project has applied beryllium. To deal with large heat load and blistering of the target system, we developed a three-layer structure for the target system that includes a blistering mitigation material between the beryllium used as the neutron generator and the copper heat sink. The three materials were bonded through diffusion bonding using a hot isostatic pressing method. Based on several verifications, our project chose palladium as the intermediate layer. A prototype of the neutron target system was produced. We will verify that sufficient neutrons for BNCT treatment are generated by the device in the near future.

Keywords: boron neutron capture therapy, accelerator-based neutron source, beryllium, target material, blistering, hydrogen storing material, hot isostatic pressing

Download English Version:

<https://daneshyari.com/en/article/8209484>

Download Persian Version:

<https://daneshyari.com/article/8209484>

[Daneshyari.com](https://daneshyari.com)