Upper limit for the ^{248}Cm(^{50}Ti,xn)$^{298-x}$Og reaction cross section

B. JP Gall[1,2], K. Morita[2,3], K. Morimoto[2], D. Kaji[2], S. Ishizawa[2,4], T. Niwase[2,3], S. Yamaki[2,5], H. Haba[2], Y. Komori[2], T. Yokokita[2], K. P. Rykaczewski[6], K. Kessaci[1,2], Z. Asfari[1,2], M. W. Bordeau[1,2], T. Tanaka[1,2,3], P. Brionnet[2], H. Arakawa[5], M. Asai[2,7], O. Dorvaux[1,2], M. Filliger[1], T. Fujii[5], K. Fujita[2,7], S. Goto[2,8], E. Ideguchi[2,9], K. Inomata[5], Y. Ito[2,7], H. Kikunaga[2,10], H. Kudo[2,8], S. Mitsuoka[3], B. C. Rasco[6], H. Sakai[2], F. Tokanai[2,4], A. Toyoshima[2,7] and T. Yamaguchi[2,5]

[1] Université de Strasbourg, CNRS, IPHC UMR 7178, 67037 Strasbourg, France
[2] RIKEN Nishina Center for Accelerator-Based Science, Saitama 351-0198, Japan
[3] Department of Physics, Kyushu University, Fukuoka 819-0395, Japan
[4] Faculty of Science, Yamagata University, Yamagata 990-8560, Japan
[5] Department of Physics, Saitama University, Saitama 338-8570, Japan
[6] Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA
[7] Advanced Science Research Center, Japan Atomic Energy Agency (JAEA), Tokai, Ibaraki 319-1195, Japan
[8] Department of Chemistry, Niigata University, Niigata 950-2181, Japan
[9] Research Center for Nuclear Physics (RCNP), Osaka University, 10-1 Mihogaoka, ibaraki, Osaka 567-0047, Japan
[10] Research Center for Electron Photon Science, Tohoku University, Sendai 980-8578, Japan

After the synthesis of element 113, nihonium (Nh) via the ^{209}Bi(^{70}Zn, n) ^{278}Nh cold fusion reaction [1-3] using the RIKEN heavy-ion Linear ACcelerator (RILAC) and the GAs-filled Recoil Ion Separator (GARIS), the search for the heaviest isotopes of oganesson was initiated with GARIS-II [4] by means of the ^{248}Cm(^{50}Ti, xn) $^{298-x}$Og fusion evaporation reaction. The optimal bombarding energy for the ^{248}Cm+ ^{50}Ti reaction was determined from the quasielastic barrier distribution extracted from the excitation function of quasielastic backscattering [5]. This method optimizes the compound nucleus formation.

The search for Og was conducted for 39 days on the basis of the experimentally derived ^{50}Ti beam energy of 227.9 MeV at the middle of ^{248}Ti Cm target. A precise analysis of the dataset based on multiple event search strategies revealed no decay chains with a total dose on ^{248}Cm target of 4.93 x 10^{18} ^{50}Ti projectiles, reaching a sensitivity of 0.27 pb and a 84% upper cross section limit of 0.50 pb.

After a presentation of the experimental setup and the details of the experiment, the upper limit derived for the Og production cross section determined will be discussed and compared to the latest theoretical predictions [6-8]. The presentation will finish by a discussion of high intensity ^{50}Ti beam production and the possible role of this isotopic beam in synthesis of next superheavy elements.

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