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FIRST SUCCESSFUL CHEMICAL STUDY OF BOHRIUM (BH, ELEMENT 107)
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The arrangement of the chemical elements in the periodic table indicates similarities of chemical properties, which reflect the elements' electronic structure. For the heaviest elements, however, deviations in the periodicity of chemical properties are expected due to relativistic effects. The discovery of ²⁶⁷Bh with a half-life of ~17 s makes it an ideal candidate for gas phase chromatographic separation studies with the OLGA system, since the typical separation time with this device is about 5 s. The nuclides ²⁶⁷Bh and ²⁶⁶Bh were discovered at LBNL a few months previously via the ²⁴⁹Bk(²²Ne,4n) and ²⁴⁹Bk(²²Ne,5n) reactions [1]. For this experiment our rotating wheel system used a parent-daughter stepping mode to provide detection of α - α correlations with a greatly reduced background. Six atoms of bohrium were detected during this experiment by correlating their decay unambiguously with the decay of their daughters.

Between August 20 and October 26, 1999, an experiment to study Bh chemistry was performed at PSI, Switzerland. A 670 $\mu\text{g}/\text{cm}^2$ ²⁴⁹Bk target was irradiated with ²²Ne⁶⁺ at 118 MeV for a total beam dose of 3.0×10^{18} particles. The behavior of Bh was investigated at 180, 150, and also at 75°C. The target material was provided by Office of Science, Office of Basic Energy Research, Division of Chemical Sciences, of the U.S. Department of Energy, through the transplutonium element production program at the Oak Ridge National Laboratory.

The unambiguous identification of Bh after chemical separation allows us to conclude that like its lighter homologues, Bh forms a volatile oxychloride compound, presumably BhO₃Cl, and behaves like a typical group seven element, taking its place on the periodic table [2]. Further experimentation is being performed at PSI right now, through the end of December to investigate its chemistry in more detail relative to its lighter homologues.

[1] P. A. Wilk, K. E. Gregorich, A. Türler, C. A. Laue, R. Eichler, V. Ninov, J. L. Adams, U. W. Kirbach, M. R. Lane, D. M. Lee, J. B. Patin, D. A. Shaughnessy, D. A. Strellis, H. Nitsche, and D. C. Hoffman, "Evidence for New Isotopes of Element 107: ²⁶⁶Bh and ²⁶⁷Bh", *Physical Review Letters* **85**, 2697 (2000).

[2] R. Eichler, W. Bröchle, Ch. Düllmann, R. Dressler, B. Eichler, H.W. Gäggeler, K.E. Gregorich, T. Häfeli, U. Kirbach, D.C. Hoffman, S. Hübener, D.T. Jost, V.M. Lavanchy, C.A. Laue, H. Nitsche, J. Patin, D. Piguet, M. Schädel, D. Strellis, S. Taut, L. Tobler, Y. Tsyganov, A. Türler, A. Vahle, P.A. Wilk, A.B. Yakushev, P. Zimmermann, "Chemical Characterization of Bohrium (element 107)", *Nature* **407**, 63 (2000).