

Report of Inter-Union Group I.U.19

Joint IUPAC - IUPAP Working Party on the Discovery of Elements of atomic number greater than 111 (JWP 2006)

This group was formed in 2006 by joint action of IUPAP and IUPAC to carry out the task of the assessment of claims for the synthesis of heavy elements with $Z > 111$. This followed work by a previous Joint Working Party who implemented the criteria described by the IUPAP/IUPAC Transfermium Working Group (1988-1992) and recognized claims for elements 110 and 111.

Membership in the 2006 group was:

Chair: P.J. Karol, Carnegie Mellon University, Pittsburgh, USA (IUPAC)
Members: R.C. Barber, University of Manitoba, Winnipeg, Canada (IUPAP)
H.W. Gäggeler, Paul Scherrer Institut, Villigen, Switzerland (IUPAC)
H. Nakahara, Tokyo Metropolitan University, Tokyo, Japan (IUPAC)
E. Vardaci, Istituto Nazionale di Fisica Nucleare, Napoli, Italy (IUPAP)
E.W. Vogt, TRIUMF, Vancouver, Canada (IUPAP)

For its first report, the JWP invited the relevant laboratories to submit publications on such claims that had appeared prior to a deadline of June 30, 2007. The task of the JWP was then to review the documentation, make judgements on the priority claims and to formulate a report. The report would be sent first to the relevant laboratories for correction of factual material, then to appropriate referees in the normal procedure leading to publication. The JWP also reported to the two unions through Prof. John Corish, former President of the Inorganic Division of IUPAC.

In the discussion of the material considered in our first report, one of the members, Prof. Gäggeler, carefully recused himself from discussion of work in which he had participated. In order to remove any suggestion of inappropriate activity, he later decided to withdraw from the committee, a decision that was accepted with great regret.

The remainder of the JWP met at TRIUMF in Vancouver in May 2008 for three days and was joined by Prof. Corish as an observer.

The first report of the JWP was on element 112 (P.J. Karol, R.C. Barber, H. W. Gäggeler, H. Nakahara, E. Vardaci, and E. Vogt, *Discovery of the element with atomic number 112 (IUPAC technical report)*, Pure and Applied Chemistry **81**, 1331-1343 (2009)). It recognized the claim of the research collaborations of Hofmann *et al* at the Gesellschaft für Schwerionenforschung (GSI), Darmstadt, Germany.

A second report (Robert C. Barber, Paul J. Karol, Hiromichi Nakahara, Emanuele Vardaci and Erich W. Vogt, *Discovery of the elements with atomic numbers greater than or equal to 113 (IUPAC technical report)*, Pure and Applied Chemistry, **83**, No. 7, pp 1485-1498) was closely related to the first report. In it, the claims of Dubna-Livermore collaborations for priority of discovery of elements 114 and 116 were recognized. Names have not yet been formally proposed. At the time of preparation of this report, claims for 113, 115, and 118 were deemed to be insufficiently certain.

Names for three elements whose synthesis has been confirmed by this and the previous JWP have been proposed by the relevant laboratories and accepted by IUPAC. These are:

Element 110 darmstadtium, symbol Ds
Element 111 roentgenium, symbol Rg
Element 112 copernicium, symbol Cn

It is recommended that the IUPAP General Assembly formally accept these names and symbols.