

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

INORGANIC CHEMISTRY DIVISION
COMMISSION ON NOMENCLATURE OF INORGANIC CHEMISTRY*

NAMES AND SYMBOLS OF TRANSFERMIUM ELEMENTS

(IUPAC Recommendations 1997)

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Names and symbols of transfermium elements (IUPAC Recommendations 1997)

Abstract: Revised recommendations for the names and symbols of the transfermium elements (atomic numbers 101–109) are presented along with the reasons for proposing them.

INTRODUCTION

The recommendations (ref. 1) of the Commission on Nomenclature of Inorganic Chemistry (CNIC) on the nomenclature of the transfermium elements (101–109, inclusive) were considered by the IUPAC Bureau at Guildford (UK) in September 1995. As a result of the various criticisms of the recommendations and the way that they had been processed, the Bureau decided to adopt the recommendations as provisional and to circulate them to national/regional nomenclature centres in the normal way, with notices to be published in national/regional chemistry journals and magazines, requesting submission of comments to CNIC. In particular, the National Adhering Organizations (NAOs) were invited to express their views concerning the extant proposals for the names of these elements and the principles and traditions used to derive them. The response from the general chemical community was small, and the bulk of the replies came from nuclear scientists.

RECOMMENDATIONS

The Commission reconsidered all the names at a meeting in Chestertown, Maryland (USA) in August, 1996. Although it is accepted that the discoverers of a new element have the right to propose a name and that such suggestions must receive serious consideration, it is also accepted that the final decision in such matters should be taken by CNIC, and ultimately confirmed by the Interdivisional Committee on Nomenclature and Symbols, Bureau, and Council of the Union. At Chestertown, CNIC reiterated its acceptance of the conclusions of the Transfermium Working Group (TWG) as a basis for taking decisions (refs. 2–4). However, it also decided to modify its decision that the name of a living scientist should not be used as the basis for an element name. The responses from the NAOs and the chemical community showed quite clearly that chemists in general do not regard this as an important issue and many thought it irrelevant. The Commission agreed, in keeping with tradition, to the use of appropriate names derived from (a) mythical concepts or characters, (b) place, area or country, (c) a property of the element, and (d) a scientist.

After some discussion CNIC agreed that elements 101, 102 and 103 should retain their commonly accepted names mendelevium, nobelium, and lawrencium. This is despite the fact that the original Swedish claim to have prepared element 102 was subsequently shown to have been in error by the Dubna laboratory, which finally achieved an undisputed synthesis. The discovery of element 106 by the Berkeley laboratory is uncontested and the name proposed by the discoverers, seaborgium, was accepted. The discoveries of elements 107 (jointly by the Darmstadt and Dubna laboratories), and of 108 and 109 (by the Darmstadt laboratories) are also uncontested. The discoverers wished to call these nielsbohrium, hassium, and meitnerium, respectively, and the Commission accepted the last two. However, the proposal for 107 was the subject of vigorous debate. The name nielsbohrium is long and includes the first name of Niels Bohr as well as his family name. Such an element name is without precedent. Finally it was decided to refer the matter to the Danish NAO. Its preference for bohrium rather than nielsbohrium was ultimately accepted.

The discoveries of elements 104 and 105 are contested by Dubna and Berkeley. Both laboratories appear to have made significant contributions, but what has clearly emerged from the submissions, including those from Berkeley and from Darmstadt, is that the Dubna laboratory has played a key role in developing the experimental strategies used in synthesizing several transfermium elements. The Commission recommended that element 105 should be named dubnium in its honour. The Berkeley laboratory has

already been similarly recognized on more than one occasion. Finally, the Commission accepted the name rutherfordium for element 104, to honour the New Zealand nuclear physicist, Ernest Rutherford.

The agreed list of recommendations is as follows:

Element	Name	Symbol
101	mendelevium	Md
102	nobelium	No
103	lawrencium	Lr
104	rutherfordium	Rf
105	dubnium	Db
106	seaborgium	Sg
107	bohrium	Bh
108	hassium	Hs
109	meitnerium	Mt

The Commission benefited from the presence of a representative of the International Union of Pure and Applied Physics (IUPAP) at its meeting in Chestertown. It is to be hoped that such a person will always be available if needed, and the Commission believes that it will be important to revive a joint IUPAC-IUPAP Working Group to confirm the discovery of new elements and to adjudicate on competing claims for priority of discovery. The Commission hopes that the present collection of names will be accepted as a fair compromise between the various claims and suggestions. It recognizes important experimental and theoretical contributions to the discovery of new elements and also the international nature of our science.

REFERENCES

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