BOHRIUM

Bohrium is a synthetic chemical element with the symbol Bh and atomic number 107. It is named after Danish physicist Niels Bohr. As a synthetic element, it can be created in a laboratory but is not found in nature. All known isotopes of bohrium are extremely radioactive; the most stable known isotope is 270Bh with a half-life of approximately 61 seconds, though the unconfirmed 278Bh may have a longer half-life of about 690 seconds.

In the periodic table, it is a d-block transactinide element. It is a member of the 7th period and belongs to the group 7 elements as the fifth member of the 6d series of transition metals. Chemistry experiments have confirmed that bohrium behaves as the heavier homologue to rhenium in group 7.

ISOTOPES OF BOHRIUM

Bohrium has no stable or naturally occurring isotopes. Several radioactive isotopes have been synthesized in the laboratory, either by fusing two atoms or by observing the decay of heavier elements. Twelve different isotopes of bohrium have been reported with atomic masses 260–262, 264–267, 270–272, 274, and 278, one of which, bohrium-262, has a known metastable state. All of

these but the unconfirmed 278Bh decay only through alpha decay, although some unknown bohrium isotopes are predicted to undergo spontaneous fission.

Isotope	Half-life [45][46]	Decay mode[45][46]	Discovery year	Reaction
^{260}Bh	35 ms	α	2007	^{209}Bi(^{52}Cr,n)[47]
^{261}Bh	11.8 ms	α	1986	^{209}Bi(^{54}Cr,2n)[48]
^{262}Bh	84 ms	α	1981	^{209}Bi(^{54}Cr,n)[41]
^{262m}Bh	9.6 ms	α	1981	^{209}Bi(^{54}Cr,n)[41]
^{264}Bh	0.97 s	α	1994	^{272}Rg(—,2α)[49]
^{265}Bh	0.9 s	α	2004	^{243}Am(^{26}Mg,4n)[50]
^{266}Bh	0.9 s	α	2000	^{249}Bk(^{22}Ne,5n)[51]
^{267}Bh	17 s	α	2000	^{249}Bk(^{22}Ne,4n)[51]
^{270}Bh	61 s	α	2006	^{282}Nh(—,3α)[52]
^{271}Bh	1.2 s	α	2003	^{287}Mc(—,4α)[52]
^{272}Bh	9.8 s	α	2005	^{288}Mc(—,4α)[52]
^{274}Bh	40 s	α	2009	^{294}Ts(—,5α)[7]
^{278}Bh	11.5 min?	SF	1998?	^{290}Fl(e^-,ν_e3α)?

SOME PROPERTIES OF BOHRIUM

Chemical:

Bohrium is the fifth member of the 6d series of transition metals and the heaviest member of group 7 in the periodic table, below manganese, technetium and rhenium. All the members of the group readily portray their group oxidation state of +7 and the state becomes more stable as the group is descended. Thus bohrium is expected to form a stable +7 state. Technetium also shows a stable +4 state whilst rhenium exhibits stable +4 and +3

states. Bohrium may therefore show these lower states as well. The higher +7 oxidation state is more likely to exist in oxyanions, such as perbohrate, BhO_4^-, analogous to the lighter permanganate, pertechnetate, and perrhenate. Nevertheless, bohrium(VII) is likely to be unstable in aqueous solution, and would probably be easily reduced to the more stable bohrium.

Physical and atomic:

Bohrium is expected to be a solid under normal conditions and assume a hexagonal close-packed crystal structure (c/a = 1.62), similar to its lighter congener rhenium. It should be a very heavy metal with a density of around 37.1 g/cm3, which would be the third-highest of any of the 118 known elements, lower than only meitnerium (37.4g/cm3) and hassium (41 g/cm3), the two following elements in the periodic table. In comparison, the densest known element that has had its density measured, osmium, has a density of only 22.61g/cm3. This results from bohrium's high atomic weight, the lanthanide and actinide contractions, and relativistic effects, although production of enough bohrium to measure this quantity would be impractical, and the sample would quickly decay.[2]

The atomic radius of bohrium is expected to be around 128 pm.