



Contribution ID: 193

Type: Poster

Calculation of boiling temperature of seaborgium hexafluoride

Tuesday, May 13, 2014 5:15 PM (1h 30m)

The formulation of the Mendeleev's Periodic law says: "Properties of chemical elements and their connections are in periodic dependence..." Therefore, it is possible to define evaluate unknown or by practical consideration inaccessible constants of some connections operating with various constants of similar substances in chemical behavior [1].

Chemical similar substances are connections with a close factor of intermolecular interaction (ψ -factor). They possess the actual identical chemical properties. For calculation and an assessment of unknown physical and chemical constants, in particular, boiling temperatures widely use methods of comparative calculation if temperatures of boiling of similar connections are known, for example. A boiling temperature is one of the main characteristic constants of any substance. For molecular connections there is the following dependence:

$$(T_b \cdot M)^{0,5} = f(M) \quad (1)$$

them T_b – a boiling temperature, K;

M – molecular mass of substance, g-mol.

Dependence (1) is a straight line for similar in the chemical relation of hexafluorides of the chrome, the molybdenum and the tungsten, and also uranium.

According to works [2-4] character of a chemical bond in CrF_6 molecules ($\psi = 0,05$), UF_6 ($\psi = 0,028$), MoF_6 ($\psi = 0,038$) and WF_6 ($\psi = 0,028$) is mainly covalent, i.e. these connections define as molecular.

Chemical element No 106 which has the name "seaborgium", is chemical analog of elements of a chrome subgroup. It is possible to tell surely that seaborgium forms molecular hexafluoride, though possessing considerably smaller oxidizing ability in comparison with MoF_6 and even with WF_6 [4].

Function (1) was applied to calculation of boiling temperature of seaborgium hexafluoride, it was equal 355 K.

Literature

1. L. Pauling General Chemistry. Freeman, San Francisco, 1970.
2. K. Ohwada On the ionic and covalent characters of uranium-fluorine bonds in complex fluorides of uranium. // J. Inorg. nucl. Chem., 1976, vol. 38, No 4, pp. 741-745.
3. A.G. Morachevsky, I.B. Sladkov Physical and chemical properties of molecular inorganic connections. – L.: Chemistry. 1987 . p. 59.
4. T.A. O'Donnell, A.B. Waugh and C.H. Randall Reactivity of transition metal fluorides. Part IX. // J. Inorg. nucl. Chem., 1977, vol. 39, No 9, pp. 1597-1600.

Primary author: Dr GROMOV, Oleg (Borisovich)

Presenter: Dr GROMOV, Oleg (Borisovich)

Session Classification: Poster Session - Chemistry of Actinide and Trans-actinide Elements

Track Classification: Chemistry of Actinide and Trans-actinide Elements