BH

V4309

1955

$NaBH_4$ (Haq)

BH_4^- (Hf, S)

Gunn S.R., Green Le Roy G.

J.Amer. Chem. Soc.1955,77,N23,6197-6198

The heat of solution of sodium borohydride and the entropy of borohydride ion.

PJX.,1957,7443

V.,Ia

~~$NaBH_4$~~

BH_4^-

1955

Stockmayer W.H., Rice D.W., Stephenson C.C. YACS 1955, 77, 1980

Термохимические свойства боргидрида натрия водного иона боргидрида

термохим. свойства

ΔF_f

ΔH_f

$NaBH_4(тв) = Na^+ + BH_4^-$

$\Delta F_{298} = -5660 \pm 70$ кал $\Delta H_{298} = -1,0 \pm 0,4$

$NaBH_4(тв) + 1,25(HCl \cdot 200H_2O) + 3H_2O(ж) =$
$= NaCl \cdot 60H_2O + H_3BO_3 \cdot aq + 0,25(HCl \cdot 508H_2O + 4H_2O(г))$

сборн.

сборн.

$\Delta H = -63869$ кал

$\Delta H_f\ BH_4^-(aq) = +12{,}4$ ккал

На основании изотермических исследований реакции диссоциации $NaBH_4 \cdot 2H_2O$ найдено равным 6,23 кал, а активность воды в его молекуле (14,9 энтр. единиц) несколько равна 0,234. Отсюда стандартное изменение своб. энергии 298°K реакции $NaBH_{4(тв)} \rightarrow Na^+ + BH_4^-$ равно -5660 ± 70 кал, что приводит к станд. своб. энерг. образ. $BH^-_{4(aq)}$ равной $+28{,}6 \pm 0{,}1$ ккал станд. энтропии иона $25{,}5 \pm 1$ эе.

CN^-, NO_3^-, CO_3^{2-}, ClO_4^-, OH^-, BO_2^-,
SO_4^{2-}, PO_4^{3-}, MnO_4^-, CrO_4^{2-}, AlF_6^{3-}
MoO_4^{2-}, IO_4^-, ReO_4^-, WO_4^{2-}, SiF_6^{2-}
SeO_4^{2-}, AsO_4^{3-}, NH_4^-, $\underline{BH_4^-}$, SnF_6^{2-} } (S)

BF_4^-, IO_4^-, ReO_4^- – в водн. растворе (S)

Яцимирский К.Б.

Ж.физ.химии, 1957, 31, №9, 2121-2126 (ΔSaq)

Энтропия многоатомных ионов.

РЖХим., 1958, № 7, 20577

1957

√ 4201

OH^-, CN^-, HF_2^-, OCN^-, HO^+_2, NH^+_4, BH^-_4 , BF^-_4, — I958 V4303

$Ag(CN)^-_2$, $Au(CN)^-_2$ ($S, \Delta S_{aq}$)

O^-_2, NO^+, O^{2-}_2, N^-_3, SCN^-, NO^+_2, PH^+_4, (S)

AlH^-_4, $AlCl^-_4$ (S)

Altshuller A.P.
J.Chem.Phys., I958, 28, N 6, 1254–1255
( )

Entropies of some diatomic and polyatomic ions.

Ja

D

V 4310 [illegible]

[illegible], [illegible], [illegible] (2)

[illegible], (1–2)

Brown D.A.,
J.Chem.Phys., 1954, 22, № 2,
451–452 (англ.)

Колебательные частоты некоторых гидридных ионов с тетраэдрической конфигурацией.

РЖ.,1955,№ 5,14804

D

lo

ВИ-4 Bishop David M. 1963

Theoret. chim. acta., 1963, I, №5, 410.

Одноцентровое рассмотрение ионов аммония и гидрида бора.

(см. NH_4^+)

V4645

1964

BH_4^- (Str., rawnowesn. ugly)

Krauss M.,

J. Res. Nat. Bur. Standards, 1964, 68A, (6),

635-644

J CA, 1965

Hanslík Josef. Mechanismus redukce anorganických látok tetrahydridoboritany alkalických kovů.
"Chem. listy", 1973, 67, N12, 1239- 1255
(чеш., рез. англ.)
0030 ДМК

BH_4^-

1973

Semenenko K.N. Il'ina T.S.

Zh.Nerg .Khim.

ΔH_{aq}; ΔH_f. I973, I8(1), 7-II.

(see. KBH_4; I)

BH_4 (gas)

(SHC)

Armstrong D. R. 1974
Perkins P. G. et. al.
Rev. Roum. Chim. 1974,
19(5) 747-53 (Eng).

(cf. BH_3; III)

C. A. 1974. 81. N12

ВНур-ра

1974

Ильинский В.А.

Отчет,
апрель 1974

$\Delta H f^{0}_{298,15}$

аммиак 1856

BH_4^-

BF_4^-

BCl_4^-

$BClO_4^-$

1977

86: 162063a **Thermochemical study of complex borates** Krivtsov, N. V.; Titova, K. V.; Rosolovskii, V. Ya. (Inst Obshch. Neorg. Khim. im. Kurnakova, Moscow, USSR). *Zh Neorg. Khim.* 1977, 22(3), 679 84 (Russ). The heats of soln. in H_2O of $N(CH_3)_4[BCl_4]$, $N(C_2H_5)_4[BCl_4]$, $N(CH_3)_4[BCl_3(ClO_4)]$ and $N(C_2H_5)_4[BCl_3(ClO_4)]$ were detd. calorimetrically at 25°. The heats of decompn. of $M[BX_4]$ into $MX + BX_3$ (where M = Li, Na, K, Rb, Cs, $N(CH_3)_4$, $N(C_2H_5)_4$ and X = H, F, Cl) and of $M[BCl_3(ClO_4)]$ into $MClO_4 + BCl_3$ (where M = $N(CH_3)_4$, $N(C_2H_5)_4$) were calcd. The estd. heats of dissocn. of $BX_4^- \rightarrow BX_3 + X^-$ decrease in the order X = F > H > Cl > ClO_4.

($\Delta H_{дисс.}$)

(+3) ☒

C.A. 1977. 86 №22

B44 — Om. 23459 — 1984

Marcus Y., Loewenschuss A.,

S; Ann. Rept. Progress Chemistry, Section C, Physical Chemistry, 1984, C81, 81–135, Chem. Soc. (London).

BH_4^-

1988

108: 211437j **Hydride binding energies of boranes.** Workman, Derek B.; Squires, Robert R. (Dep. Chem., Purdue Univ., West Lafayette, IN 47907 USA). *Inorg. Chem.* 1988, 27(11), 1846–8 (Eng). Limiting values for the hydride affinities of BH_3, B_2H_6, BEt_3 and BH_2CN were detd. from threshold energy measurements for endothermic H⁻-transfer and collision-induced dissocn. reactions in a flowing afterglow triple quadrupole app. to be 74.2, 74.0, 69.4 and 96.3 kcal/mol, resp. Heats of formation for the corresponding borohydride ions BH_4^-, $B_2H_7^-$, $HBEt_3^-$ and BH_3CN^- are derived from these measurements and the trends in the hydride binding energies are discussed.

$(\Delta_f H)$

(+2) ☒

$B_2H_7^-$, BH_3CN^-

C. A. 1988, 108, N 24

BH_4^- (aq)

1990

115: 100258b **Reduction activity of aqueous borohydride solutions.** Khain, V. S.; Volkov, A. A. (USSR). *Khim. Neorg. Gidridov, [Dokl. Vses. Soveshch.], 4th* 1987 (Pub. 1990), 120–31 (Russ). Edited by Kuznetsov, N. T. Nauka: Moscow, USSR. The hydrolysis of pure or tech. MBH_4 was studied in 0.01–2.5 M MOH (M = alkali metal) solns. The rate law is $d[BH_4^-]/dt = k[BH_4^-][OH^-]^{-0.66}$ with very little dependence on the nature of M or on reagent purity. The exptl. data are best fitted by the mechanism $BH_4^- + H^+ \rightleftharpoons H_2BH_3$, $BH_4^- + H_2O \rightleftharpoons H_2BH_3 + OH^-$, $H_2BH_3 \rightarrow BH_3 + H_2$, and $BH_3 + H_2O \rightarrow B(OH)_3 + 3H_2$ (fast). Max. stability of BH_4^- occurs in 1–2 M MOH solns. The redn. activity is higher in acid solns. due to formation of the active species BH_3, BH_2OH, and $BH(OH)_2$. The reaction with $K_3Fe(CN)_6$ involves BH_3OH^- which forms rapidly in neutral or acid solns. The redn. activity of BH_4^- toward metal cations, hydroxy complexes, or oxo anions is discussed on the basis of published data.

(kc)

C.A. 1991, 115, N10

ВНЧ

Оп. 37365

1993

Saxon R.P.,

ОгН, теор. расчет

J. Phys. Chem., 1993, 97, 9356 - 9359.

1999

F: BH4+
P: 1
132:83941 The complete basis set and gaussian ab initio computational investigation mono-, di- and tri-protonated borane and mono-, di-, tri-, tetra-protonated diborane structures and energies. Jursic, B. S.
Department of Chemistry, University of New Orleans New Orleans, LA, USA THEOCHEM, 491, 147-154 (English) 1999 High levels of computational study was performed to det. geometries and energies of multiprotonated borane and diborane: BH3, BH4+, BH52+, BH63+, B2H7+, B2H82+, B2H93+, B2H104+. The enthalpies of protonation and mol. a reactions for these compds. were computed. Their stabilities and possibi to be obtained exptl. are discussed.

C.A. 2000, 132