

BH4

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

~~NaBH₄~~

BH₄⁻

термодинам.

свойства

ΔF₂₉₈

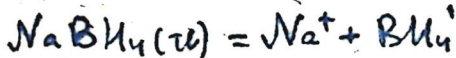
ΔH₂₉₈

соедин.

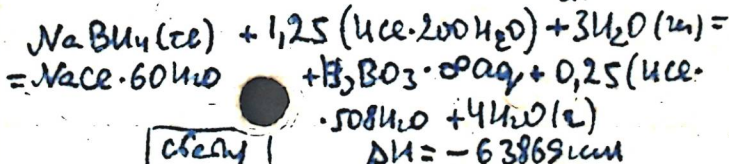
Stockmayer W.H., Rice D.W., Stephen-
son C.C. JACS 1955, 77, 1980

1955

Термодинамические свойства
боргидрида и группы борного
иона боргидрида



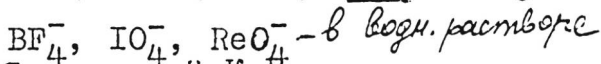
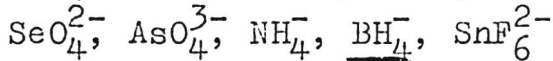
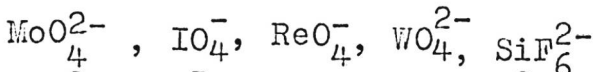
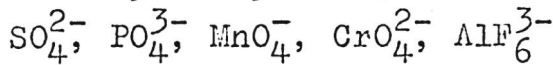
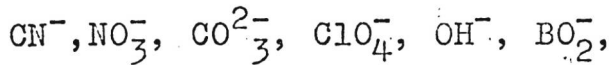
$$\Delta F_{298} = -5660 \pm 70 \text{ ккал} \quad \Delta H_{298} = -1,0 \pm 0,4$$



соед

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

На основании изотермических исследований растворения
 атом $NaBH_4 \cdot 2H_2O$ известно значение $6,23 \text{ ккал}$, а активность воды
 в со раств. ($14,8 \text{ молялей}$) равна $0,23$. Обсужда
 стандартное значение свобод. энергии $298^\circ K$ реакции
 $NaBH_4 \xrightarrow{(тв)} Na^+ + BH_4^-$ равно $-5660 \pm 70 \text{ ккал}$, то изотермич
 станд. свобод. энерг. образ. $BHy^-(aq)$ равно $+28,6 \pm 0,1 \text{ ккал}$
 станд. энтропия иона $25,5 \pm 1 \text{ эв}$.



Яцмирский К.Б.

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

Энтропия многоатомных ионов.

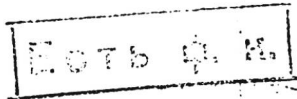
РЖХим., 1958, № 7,
20577

~~75632~~ 1957
74202

(S)

(S)

(45a9)



OH^- , CN^- , HF_2^- , OCN^- , HO_2^+ , NH_4^+ , BH_4^- , BF_4^- , I958
 $\text{Ag}(\text{CN})_2^-$, $\text{Au}(\text{CN})_2^-$ (S, S_{aq}) $\sqrt{4303}$

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.

7a

0

V 431058

114, 114, 114 (2)

114 (1-1)

Brown D. J.

J. Chem. Phys., 1950, 20, 1, 2,
451-452 (англ.)

Колобратские частоты некоторых
гидридных ионов с тетраэдрической
конфигурацией.

РХ., 1959, 2 5, 14304

10

D

BH₄⁻

Bishop David M.

1963

Theoret. chim. acta., 1963, I,
n 5, 410.

Одноцентровое рассеяние
лучей конов асимметрии
и гидрогидра бора.

(сое. NH₄⁺)

ж. 1964. 20

V4645

1964

BH_4^- (Str., rawnowesn. ugly)

Krauss M.,

J. Res. Nat. Bur. Standards, 1964, 68A, (6),
635-644

J

CA, 1965

TE, CH

BH₄⁻

25065 Kp

1973

X-3187

Hanzlík Josef. Mechanismus redukce
anorganických látek tetrahydridoboritanu
alkalických kovů.

"Chem. listy", 1973, 67, N12, 1239- 1255

(чеш., рез. англ.)

0030 мм

020 020 0 2 3

ВИНИТИ

BH₄⁻

1973

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

Zh.Nerg .Khim.

1973, 18(1), 7-II.

ΔH_{ay}; ΔH_f.

● (see. KBH₄ ; I)

BH₄ (cas)

(BH₄)

Armstrong D.R. 1974

Perkins P.G. et al.

Rev. Roum. Chim. 1974,

19(5) 747-53 (Eng).

(see BH₃; III)

C.A. 1974. 81. N12

ВНУР-РА

1974

Цавинский В.А.

Отчет,

апрель 1974

$\Delta H f^0$
298,15

отмечено 1856

BH₄⁻

1977

B·F₄⁻

BCl₄⁻

BClO₄⁻

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
H₂O of N(CH₃)₄[BCl₄], N(C₂H₅)₄[BCl₄], N(CH₃)₄[BCl₃(ClO₄)]
and N(C₂H₅)₄[BCl₃(ClO₄)] were detd. calorimetrically at 25°.
The heats of decompn. of M[BX₄] into MX + BX₃ (where M =
Li, Na, K, Rb, Cs, N(CH₃)₄, N(C₂H₅)₄ and X = H, F, Cl) and of
M[BCl₃(ClO₄)] into MClO₄ + BCl₃ (where M = N(CH₃)₄,
N(C₂H₅)₄) were calcd. The estd. heats of dissocn. of BX₄ :
BX₃ + X decrease in the order X = F > H > Cl > ClO₄.

(ΔH_{qucc.})

(+3) ☒

C.A. 1977, 26, 22

BH4-

[Om. 23459]

1984

S; Marcus Y., Loewenschuss A.,
Ann. Rept. Progress Chemistry,
Section C, Physical Chemist-
ry, 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.

(ΔH)

(+2) Δ



B_2H_7^- , BH_3CN^-

C.A. 1988, 108, n 24

BH_4^- (aq)

1990

(Kc)

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 $d[\text{BH}_4^-]/dt = k[\text{BH}_4^-][\text{OH}]^{-0.66}$ with very little dependence on the nature of M or on reagent purity. The exptl. data are best fitted by the mechanism $\text{BH}_4^- + \text{H}^+ \rightleftharpoons \text{H}_2\text{BH}_3$, $\text{BH}_4^- + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{BH}_3 + \text{OH}^-$, $\text{H}_2\text{BH}_3 \rightarrow \text{BH}_3 + \text{H}_2$, and $\text{BH}_3 + \text{H}_2\text{O} \rightarrow \text{B}(\text{OH})_3 + 3\text{H}_2$ (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 $\text{BH}(\text{OH})_2$. The reaction with $\text{K}_3\text{Fe}(\text{CN})_6$ 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.

C.A. 1991, 115, N10

BH4

Om. 37365

1993

Saxon R.P.,

Δ₅H,
neop.
p. acem

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