Na - Cu, Ag, Au

1963

$Na[Cu(C_2H_3N_3O_2)\cdot OH\cdot H_2O]\cdot H_2O$, $Na[Cu(C_2H_3N_3O_2)_2]$

(Vi)

Aida K., Musya Y., Kinumaki S.,

Inorganic Chemistry, 1963, 2, 1268-6

РЖ Хим., 1964, 15Б123

НО

(ВФ-3579-Х)

1964

$Na_2Cu(CO_3)_2 \cdot 3H_2O$ (r_{Cu-Cu})

Hatfield W.E.,

J. Elisha Mitchell Scient. Soc.,

1964, 80, N1, 44-45

10

Рнех, 1965, 18Б236

D_0(LnAu, CeAu, PrAu, NdAu, LiAu, NaAu, KAu, NaAu, RbAu, CsAu, MgAu, CaAu, SrAu, BaAu, Li_2, K_2, Na_2, Rb_2, Cs_2, Mg_2, Ca_2, Sr_2, Ba_2)

ΔH_f(LnAu, CeAu, PrAu, NdAu)

VIII 3700

Gingerich K.A., Finkbeiner H.C., J. Chem. Phys., 1970, 52, N6, 2956-2964

PP 1970, 82286 10 ml (pp)

$Na_4[Cu(NH_3)_4]\cdot[Cu(S_2O_3)_2]$

$Na\cdot[Cu(S_2O_3)_2]$

$Na_4[Cu(NH_3)_4]\cdot[Ag(S_2O_3)_2]$

1970

Neuman G. A.

ИК-спектр

J. Inol. Nucl. Chem.,

1970, 5, № 1-2, 61

(Cu Na-Ni) III

NaAg Bp 7412-X 1972

✓ 169522x Thermodynamic study of the molecule NaAg with a mass spectrometer. Piacente, Vincenzo; Gingerich, Karl A. (Ist. Chim.-Fis., Univ. Rome, Rome, Italy). *High Temp. Sci.* 1972, 4(4), 312–17 (Eng). The gaseous equil. (*1*) NaAg(g) = Na(g) + Ag(g), (*2*) NaAg(g) + Ag(g) = Na(g) + Ag_2(g) were measured by using a double oven technique in combination with mass spectrometric anal. of the vapor compn. The 3rd law enthalpies $\Delta H_0°$, in kcal/mole, for these reactions were evaluated as 32.0 ± 0.3, and −6.5 ± 0.2, resp. From these enthalpies the dissocn. energy $D_0°$ (NaAg) = 31.8 ± 3.0, kcal/mole was obtained. The corresponding $D°_{298}$ value is 32.4 ± 3.0 kcal/mole. The std. heat of formation $\Delta H°_{f,298}$ of NaAg(g) was derived as 61.4 ± 3.4 kcal/mole. The exptl. dissocn. energy of NaAg(g) is considerably lower than the value of 51 kcal/mole calcd. after the Pauling model of a polar bond.

$D_0°$

$\Delta H°_{f\,298}$

C.A. 1972. 77 N26

NaAg

Вр 7412-Х

1972.

6 Б746. Термодинамическое исследование молекулы NaAg на масс-спектрометре. Piacente Vincenzo, Gingerich Karl A. Thermodynamic study of the molecule NaAg with a mass spectrometer. «High Temp. Sci.», 1972, 4, № 4, 312—317 (англ.)

(D₀, ΔHf)

В области т-р 1460—1595° К на масс-спектрометре исследованы р-ции NaAg (газ) = Na (газ) + Ag (газ) (1) и NaAg (газ) + Ag (газ) = Na (газ) + Ag_2 (газ) (2). Для одновременного получения в парах молекул Na и Ag использовалась двойная эффузионная камера. По 3-му закону получены $\Delta H_T°$ р-ций (1) и (2), к-рые с помощью лит. данных пересчитаны к 0° К, и равны соотв. $H_0° = 32{,}0 \pm 0{,}3$ и $-65 \pm 0{,}2$ ккал/моль. Получены $D_0°$ (NaAg) = $31{,}8 \pm 3{,}0$ ккал/моль и ΔH (обр., 298, NaAg, газ.) = $61{,}4 \pm 3{,}4$ ккал/моль. Для определения парц. давл. калибровка прибора производилась по лит. значению $D_0°$ (Ag_2) = $38{,}0 \pm 1{,}5$ ккал/моль. Эксперим. значение $D_0°$ (NaAg) на 19 ккал/моль меньше теоретического, рассчитанного по ур-нию Полинга. Резюме

X. 1973. № 6.

(+1) ☒

Ж-4644 1973

NaCu	Энергия диссоциации и теплота образования молекул NaCu.
(Do;)	Piacente Vincenzo.
	„Z. Naturforsch" 1973, 28a, №2, 316-317.
ж.1974 N17	(см. NaCu, T)

$NaAg(NO_2)_2$ X-7880 1973

25299y Infrared spectrum of sodium dinitroargentate ($NaAg(NO_2)_2$). Rabkin, L. M.; Chubich, A. A.; Latush, L. T. (Rostov.-na-Donu Gos. Univ., Rostov-on-Don, USSR). *Fiz. Tverd. Tela* (*Leningrad*) 1973, 15(4), 1294–5 (Russ). In the ir spectrum of $NaAg(NO_2)_2$, there are bands at 436 and 415 cm^{-1} which can be related to the valence vibration of Ag-N bond. In the polarization spectra on the high frequency side of these bands, a fine structure was obsd. with a sepn. of 12 cm^{-1}. Also present is a completely polarized band at 631 cm^{-1} along the *b* axis. This band also has a fine structure with a sepn. of 12 cm^{-1} and is apparently related to the stretching vibration of NO_2^- ion. When the elec. vector is directed parallel to the *b* axis, 2 bands were obsd. at 846 and 829 cm^{-1}. When the elec. vector is normal to the *b* axis, the intensity of these bands decreases and their structure becomes more complicated. A. Libackyi

C. A. 1973. 79 N 4

NaCu (d)

1974

Placento Vincenzo, Gingerich Karl A.
The dissociation energy and heat of formation of the molecule NaCu. "Z. Naturforsch.", 1973, 28a, N 2, 316-317

(англ.) 0102 ГИЗК

Na Ag
Na Au

Omnicon 6055

1977

Piacente Vincenzo et al.

High Temp. Sci 1977,
9(3), 189-96

(Do)

cit. manuscript

cel. Na Au - I

NaAg

Pittsburgh 8151 1979

91: 113269s **Dissociation energy of the silver compound with sodium(1:1) molecule.** Pelino, M.; Piacente, V.; D'Ascenzo, G. (Inst. Phys. Chem., Univ. Rome, Rome, Italy). *Thermochim. Acta* 1979, 31(3), 383-6 (Eng). In order to confirm a dissoen. energy value of 31.8 ± 3.0 kcal/mol for NaAg, new expts. were carried out on the Na-Ag system. Two reactions were considered: (1) NaAg(g) → Na(g) + Ag(g) and (2) Na(g) + Ag_2(g) → NaAg(g) + Ag(g). The heats of the reactions (33.1 ± 0.1 and 4.0 ± 0.3 kcal/mol) lead to dissoen. energy values of 33.1 ± 2.0 and 34 ± 3 kcal/mol., resp. The recommended value for the dissoen. energy of NaAg is 31.8 ± 3.0 kcal/mol.

(D_0°)

X-10329

C.A. 1979 91 N14

No. 44 1982.

Scheuring Thomas, Weil
Konrad G.

Int. J. Mass Spectrom. and
Ion Phys., 1983 47; Mass Spec-
trom. Abv., 1982. Proc. 9 Int.
Mass Spectrom. Conf., Vienna
Aug. 30 – Sept. 3, 1982. Part C,
227-230. (см. $Li^+ + Tl = LiTl$; I

ошибка

Do;

Na Au | Ommerk 16086 | 1983

Scheurino T., Weil K. G.

Int. J. Mass Spectrom.

Do; and Ion Phys., 1983, 47,

227-230.

CuH + H → Cu + H_2 термич. реакция 1984

CuH+H→Cu+H_2 (фотохим. реакц.) в матричной фазе

20 Б4373. **Термическая реакция CuH+H→Cu+H_2 и фотохимическая реакция Cu+H_2→CuH+H в матричной фазе.** The CuH+H→Cu+H_2 thermal and Cu+H_2→CuH+H photochemical matrix phase reactions. Ozin Geoffrey, Gracie Catherine. «J. Phys. Chem.», 1984, 88, № 4, 643—645 (англ.)

Продолжены исследования методами абсорбц. спектроскопии в области 200—450 нм обнаруженных ранее (Ozin G. A. et al., «Angew. Chem.», Int. Ed. Suppl., 1982, 785) фотохим. процессов с участием атомов Cu и молек. водорода в тв. матрицах Ar, Kr и Xe при т-рах 10—20 K. В образцах Cu—H_2 (или D_2)—Kr состава $1 : 10^3 : 10^4$ при т-ре 10—12 K возбуждение атомов Cu в состояние ^2S светом 310 нм приводит к р-ции Cu+ +H_2(D_2)→CuH(CuD)+H(D), к-рая протекает с большим квант. выходом (~0,5) и малым кинетич. изотопным эффектом (~1,16) для хим. тушения фотовозбужденных атомов Cu*. При последующем нагревании

образца до 18—20 K протекает обратная р-ция CuH+ +H→Cu+H_2. Ее скорость практически не зависит от типа матрицы и не обнаруживает кинетич. дейтероводородного изотопного эффекта для р-ций CuH+H и CuD+D. Это показывает, что скорость р-ции не контролируется диффузией и что активац. барьер р-ции рекомбинации CuH+H пренебрежимо мал. В. Е. Скурат

AgNa

1985

11 Б1224. **Электронные и колебательные спектры молекулярных кластеров и малых частиц AgNa.** Electronic and vibrational spectra of AgNa molecular clusters and small particles. Pflibsen K. P., Huffman D. R. «Surface Sci.», 1985, **156**, № 2: Small Part. and Inorg. Clusters. Proc. 3 Int. Meet., Berlin (West), 9—13 July, 1984. Pt 2, 793—799 (англ.)

Исследованы электронные и колебат. спектры молек. кластеров и малых частиц AgNa, изолированных в Ar-матрице на Si-подложке при т-ре 6—13° K. Образцы осаждались на подложке из 3 молек. пучков. Изменение конц-ии металла в матрице и т-ры подложки в процессе осаждения позволяет получать молек. кластеры и малые частицы различных размеров. Экспер. результаты сравниваются с модельными расчетами. Влияние матрицы на изолированные частицы учитывалось введением эффективного Пт и параметрами волновой функции. Положение колебат. пиков в спектрах поглощения молек. кластеров довольно точно рассчитано таким образом в рамках приближения динамич. матрицы.

А. П. Кощеев

спектр в матрице, м.п.

Х. 1986, 19, N1

Li Na (ат. 27440) 1987

Bauschlicher Ch. W., Jr.,
Langhoff S. R., et al.,

кл. п.,
теорем.
расчет.

J. Chem. Phys., 1987,
86, N 10, 5603–5612.

(сеч. на Li; III)

Na · Cu$_n$

$n = 1 \div 4$

1987

106: 108227a **Sodium atom on copper clusters.** Tate[illegible] Hiroshi; Tomonari, Mutsumi; Nakamura, Takashi (Res. [illegible] Catal., Hokkaido Univ., Sapporo, Japan 060). *Phys. Rev. B: Condens. Matter* 1987, 35(2), 581–95 (Eng). The interaction [illegible] Na atom with Cu$_n$ (n = 1–4) clusters is investigated by ab initio calcns. Two types of stable states of NaCu$_n$ are found except for NaCu. They are of the charge-transfer (*CT*) and non-charge-transfer (NCT) types. The former is more stable than the latter, esp. for NaCu$_3$ and NaCu$_4$. The first ionization potential of NaCu$_n$ is almost smaller than that of Cu$_n$. CI calcns. were also performed for NCT and *CT* NaCu$_2$ and NaCu$_3$ clusters at their potential min. given by the SCF calcns. The CI calcns. yield almost the same gross [illegible] populations as the the SCF calcns., suggesting that the SCF method provides a reliable description of the charge clouds. The interaction energy of Na with Cu$_n$ indicates that the initial adsorption energy of Na on the solid Cu surface is ~52kcal/mol.

(теорет. расчет)

C.A. 1987, 106, N 14

NaCu

1989

Boca R.

Int. J. Quantum. Chem.

1989. 36, N 6. C. 727-739.

(Cel. ● NaH; III)

1989

NaAg

Boca R.

Int. J. Quantum. Chem.
1989. 36, N6. C. 727-739.

(Сер. ● NaH; III)

NaAu

1989

Boca R.

Int. J. Quantum. Chem.

1989. 36, N6. C. 727-739.

(Ссл. ● NaH; III)

Au_nNa_m

$n = 6 \div 13$

$m = 0 \div 10$

1993

119 2[11]94c **Ionization potentials of gold-sodium (Au_nNa_m) bimetallic clusters.** Hoshino, Kuniyoshi; Naganuma, Takashi; Watanabe, Katsura; Nakajima, Atsushi; Kaya, Koji (Department of Chemistry, Faculty of Science and Technology, Keio University, 3-14-1 Hiyoshi, Kohoku-ku, Yokohama, Japan 223). *Chem. Phys. Lett.* 1993, 211(6), 571-4 (Eng). Ionization potentials of Au_nNa_m bimetallic clusters, where n = 6-13 and m = 0–10, were measured by a tunable UV laser combined with a time-of-flight mass spectrometer. The ionization potentials of Au_nNa_m clusters generally decrease with the no. of Na atoms, but discontinuities in the ionization potentials of Au_nNa_m clusters are obsd. when the total no. of valence electrons in the clusters fills an electronic shell. This result indicates that valence electrons of both Au atoms and Na atoms are delocalized in the clusters, forming the electronic shell.

(Y)

C. A. 1993, 119, N 20

NaAg
NaAg$^+$

1993

123: 93598x **Pseudopotential calculation with correlated wave function. XY alkali-metal – noble-metal compounds (X = Na, K, Rb, Cs; Y = Ag, Au).** Tamassy-Lentei, I.; Derecskei-Kovacs, A. (Institute of Theoretical Physics, Kossuth Lajos University, H-4010 Debrecen, Hung.). *Acta Phys. Chim. Debrecina* **1993**, 28 37-48 (Eng). Mixed alkali-metal – silver and alkali-metal – gold mols., XAg and XAu and unipos. mol. ions XAg$^+$ and XAu$^+$ (X=Na, K, Rb, Cs) have been investigated using semi-empirical pseudopotentials and one-center wave functions. In the case of neutral systems the wave functions were direct correlated ones contg. explicitly the interelectronic distance. All the mentioned systems were found stable in the ground state. Equil. nuclear distances, dissocn. energies, ionization potentials and elec. dipole moments have been detd. Very few exptl. and theor. data are available for comparison purposes; the predicted values are reasonable.

Re, Do, I, мол. рамен

1) KAg, KAg$^+$ 2) RbAg, RbAg$^+$
3) CsAg, CsAg$^+$

(43)

C. A. 1995, 123, N 8

NaAg

1997

126: 284497k **Photoionization spectroscopy of NaAg.** Stangassinger, A.; Knight, A. M.; Duncan, M. A. (Department of Chemistry, University of Georgia, Athens, GA 30602 USA). *Chem. Phys. Lett.* 1997, 266(1,2), 189–194 (Eng), Elsevier. Two electronic systems of NaAg are obsd. with resonant photoionization spectroscopy, a weak one near 300 nm and a much stronger one at 330 nm. The 300 nm system correlates to the dipole–forbidden 3s–4s (^2S—^2S) transition of Na and the stronger transitions converge to the 3s–3p (^2P—^2S) transition of Na. Vibrational consts. of three upper states and the ground state are reported. 39 bands are obsd. for the weak G—X transition originating from v" = 0–3 ground state vibrational levels. The ground state binding energy is greater than or equal to 1.59 eV and the vibrational frequency (ω_e") is 210 cm^{-1}.

(ω_e" u gp)

C. A. 1997, 126, N21

Ag_4Na 1998

Moskovskii A. A. et al.,

Vestn. Mosk. Univ., Ser. 2: Khim. 1998, <u>39</u>(2), 83–86.

теорет-расчет стр-р, потенц. поверхн.

(см. Ag_4 Li; <u>III</u>)

6# 39671 1999

F: NaAu
P: 3
130:259038 Photoionization Spectroscopy of KAu and NaAu Diatomics. Stangassinger, A.; Knight, A. M.; Duncan, M. A. (Department of Chemistry, University of Georgia, Athens, GA 30602, USA). J. Phys. Chem. A, 103(11), 1547-1552 (English) 1999 American Chemical Society. CODEN: JPCAFH. ISSN: 1089- 5639. DOCUMENT TYPE: Journal CA Section: 73 (Optical, Electron, and Mass Spectroscopy and Other Related Properties) The new metal diatomics KAu and NaAu are studied using resonant 2-photon ionization (R2PI) electronic spectroscopy. These species are produced by laser vaporization of a salted Au rod in a pulsed nozzle cluster source. Anal. of the spectra provides the vibrational consts. for the excited states and correlations to specific at. asymptotes. Energetic cycles provide detns. of the ground- state dissocn. energies. The values are D0'' = 2.75 .+-. 0.2 eV for KAu and D0''

C.A. 1999, 130, #19.

= 2.64 .+-. 0.2 eV for NaAu. These dissocn. energies for the heteronuclear diatomics are significantly greater than those for the corresponding homonuclear diatomics Na2, K2, or Au2. Partial ionic character in the ground state bonding is implicated, analogous to that obsd. previously for Ag and Cu-alkali diatomics.

photoionization spectroscopy gold potassium diatomic; gold sodium diatomic photoionization spectroscopy Clusters, Dissociation energy, Excited state, Ground state, Molecular vibration, Nozzles, Photoionization, Resonant two-photon ionization, photoionization spectroscopy of KAu and NaAu diatomics; 7440-23-5, properties, diat. mol. with Au; photoionization spectroscopy of KAu and NaAu diatomics; 7440-57-5, properties, diat. mol. with K; photoionization spectroscopy of KAu and NaAu diatomics; 12187-09-6, properties, 25681-79-2, properties, 25681-80-5, properties, photoionization spectroscopy of KAu and NaAu diatomics