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:(343) 371-19-97, : (343) 371-19-97, E-mail: krupenin@igg.uran.ru

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 1500
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 40
 [(12 ; , 2012),
 (12 ; ,)
 ICP-MS (7 ; . . .).
 Nexus Continuum Thermo Nicolet (20 ,) Spotlight
 Perkin Elmer (,)

2006-11 .

1.

2.

H-

3.

1. , :
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Al-OH 4–9 ppm, 4 ppm.
« »

2. -
150 ppm, 200–1600 ppm.
- ,

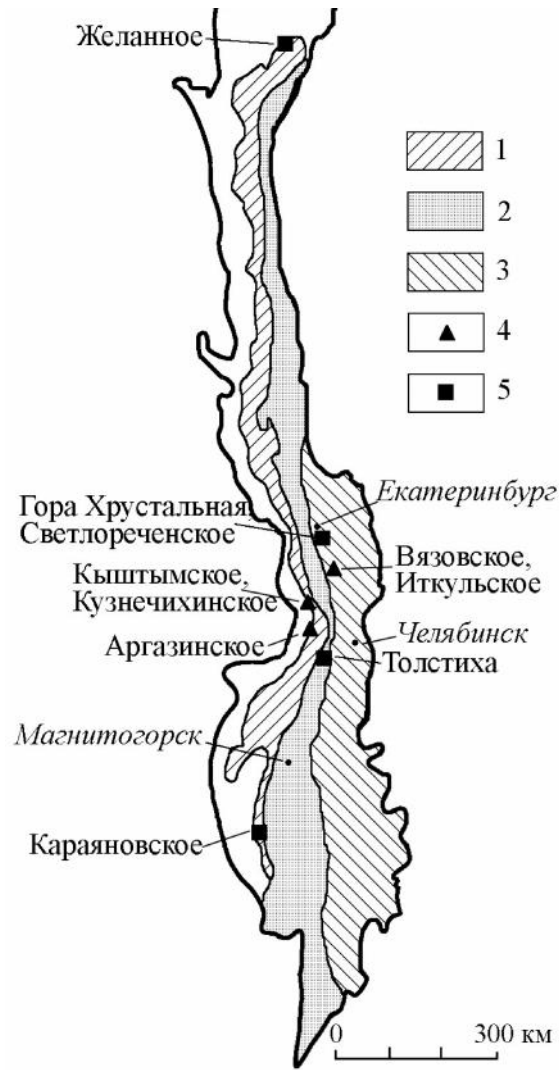
(< 30 ppm), (5–350 ppm).
3.

Al-OH

, 2007; , 2008;
2008, 2010 2012 .; ,
« : , », , 2009-
12; XVII « , 2011.
», - 19 , 8 , 7
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109 , 6
(, 163
, 103 , 11 :
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(. 1).
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1 - ; 2 - ; 3 - ; 4 - ; 5 -

., 1969]:

1)

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2)

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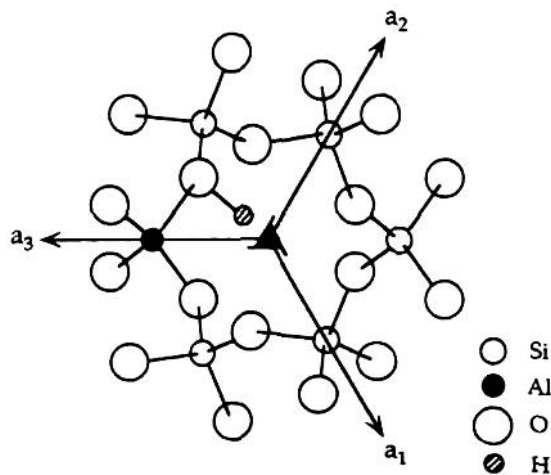
Thermo Nicolet

Nexus-870
OMNIC

CCl₄

« »

2



OH

2 -

3432 3378 ⁻¹ [Pankrath, 1991].

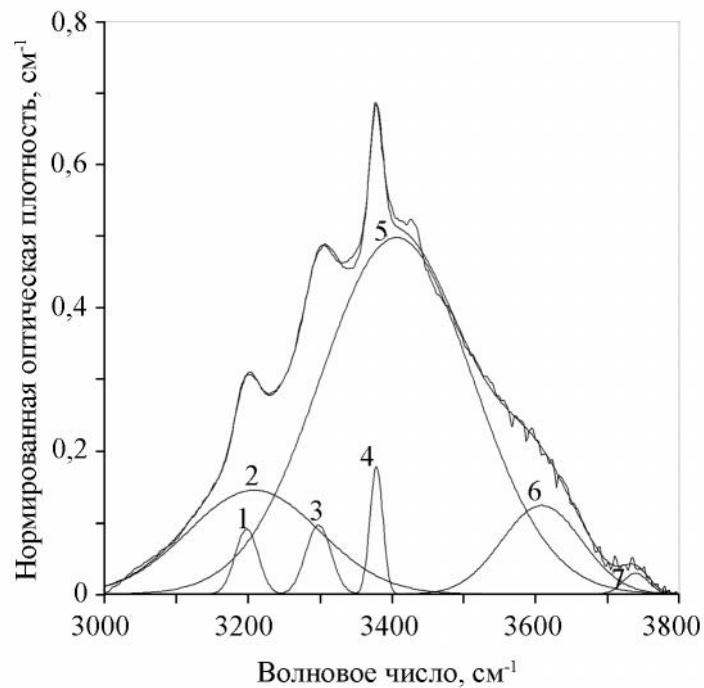
Al

Peakfit,

(. 3).

1.

« »



3 – « »
(. 513-1,).

1 – (.
513-1,).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------------|------|------|------|------|------|------|------|
| , ⁻¹ | 0,09 | 0,14 | 0,10 | 0,18 | 0,50 | 0,12 | 0,03 |
| , ⁻¹ | 3198 | 3208 | 3298 | 3379 | 3407 | 3609 | 3739 |
| , ⁻² | 3,7 | 30 | 4,3 | 4,0 | 130 | 20 | 1,3 |
| , ⁻¹ | 38 | 217 | 42 | 21 | 250 | 132 | 43 |

Aines, Rossman, 1984; Kronenberg, 1994]. [Kats, 1962;
(1) 3300 ⁻¹ (3) 3200 ⁻¹

Si-O . 3220 ⁻¹ (2) 3410 ⁻¹
(5) (1)

(3) O-H . [Du et al., 1994;
Ostroverkhov et al., 2004]

(SFG) 3410 ⁻¹

1 . (« »).

« »

Al-OH ν_{OH} 3378 ⁻¹ (ν_{OH} 4) ν_{OH} SiO₄ [Kats, 1962; Aines, Rossman, 1984; Kronenberg, 1994].

ν_{OH} 3600 ⁻¹ ν_{OH} 3740 ⁻¹ ν_{OH} OH- Si-OH [Kronenberg, 1994].

ν_{OH} 3600 ⁻¹ ν_{OH} 3740 ⁻¹ OH- [Aines, Rossman, 1985; Zalkind, Gershenkop, 2006]

$$C(\text{H}_2\text{O}) = C_{\text{H}} \cdot \frac{N_{\text{A}} \cdot M(\text{H}_2\text{O}) \cdot 10^6}{N_{\text{A}} \cdot M(\text{SiO}_2) \cdot 10^6} = K \cdot s \cdot \frac{M(\text{H}_2\text{O})}{M(\text{SiO}_2)} \quad (1)$$

$C(\text{H}_2\text{O})$ – ; $M(\text{H}_2\text{O})$ – ; $M(\text{SiO}_2)$ – , ppm; – 10^6 Si; N_{A} – ; / ; K – ($K = 1,05$), s – ν_{OH} ⁻² (1) :

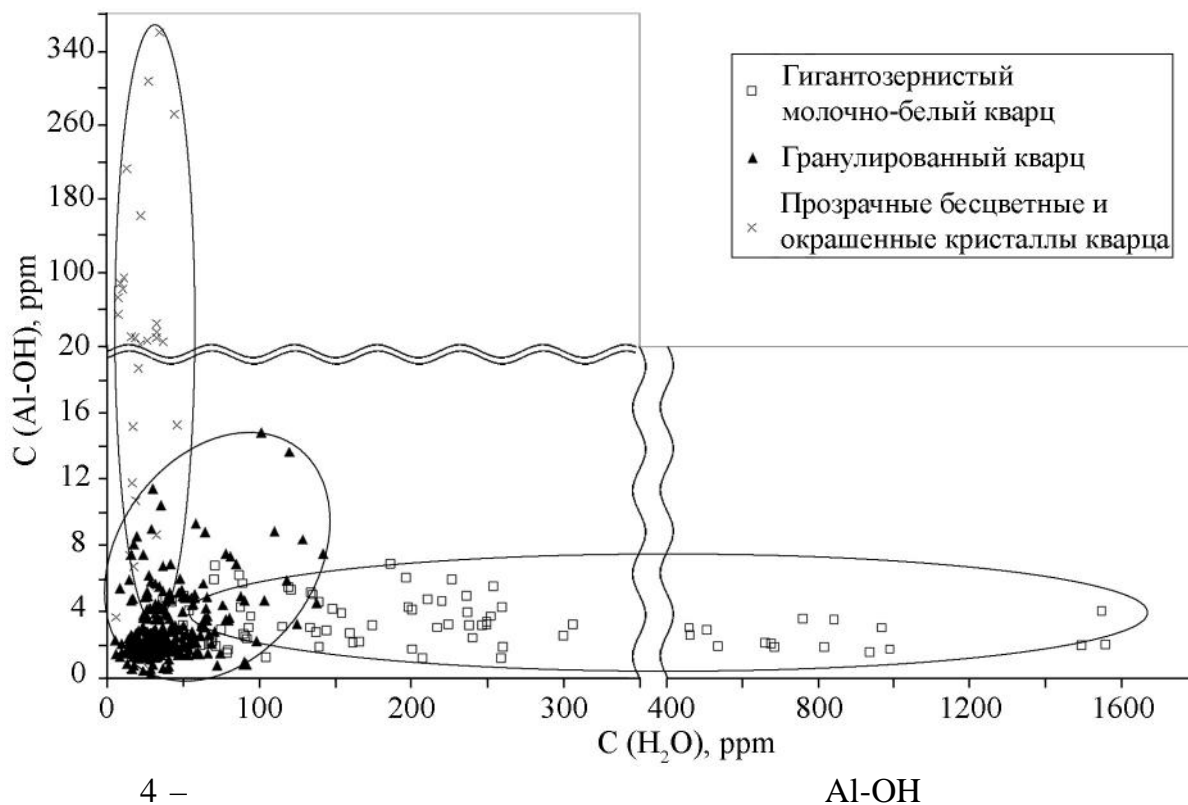
$$C(\text{OH}) = C_{\text{H}} \cdot \frac{M(\text{OH})}{M(\text{SiO}_2)} \cdot T_{\text{coef}} = K \cdot s \cdot \frac{M(\text{OH})}{M(\text{SiO}_2)} \cdot T_{\text{coef}} \quad (2)$$

$C(\text{OH})$ – OH , ppm; $M(\text{OH})$ – OH, / ; K – ($K = 1,87$ OH); T_{coef} –

(. 4).

Al-OH.

Al-OH Al-O(Li).
Al-OH



Al-OH

5.

(800–1600 ppm),

– 200–

500 ppm

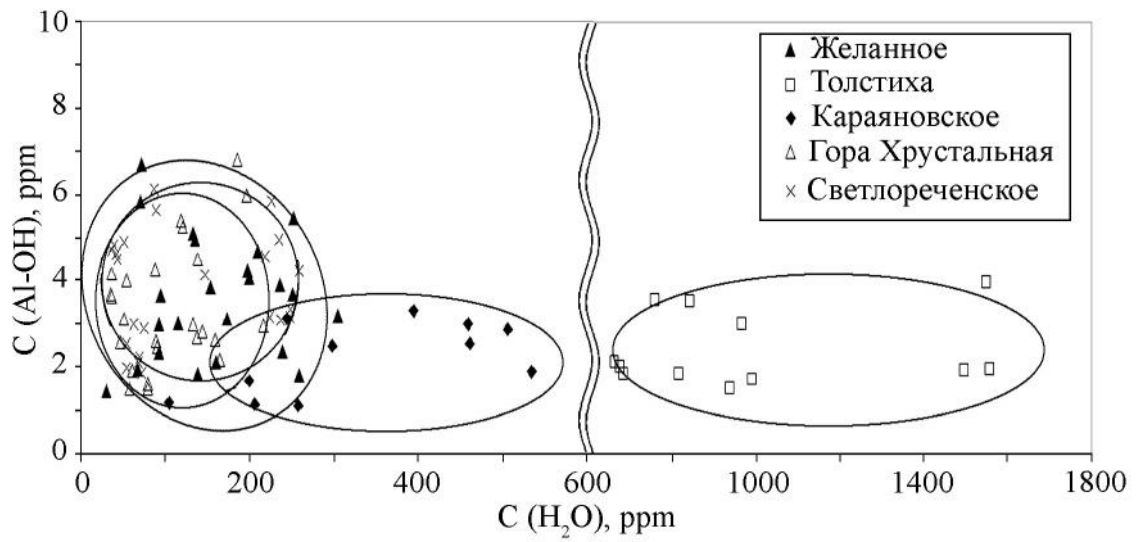
300 ppm.

Al-OH

Al-OH

1–6 ppm.
Al-OH

2 ppm.



5 -

Al-OH

6.

: H₂O 10–150 ppm, Al-OH 1,5–11,5 ppm.

20 90 ppm, Al-OH – 2 9 ppm.

OH- : 20–70 ppm

2–6 ppm,

10–100 ppm.

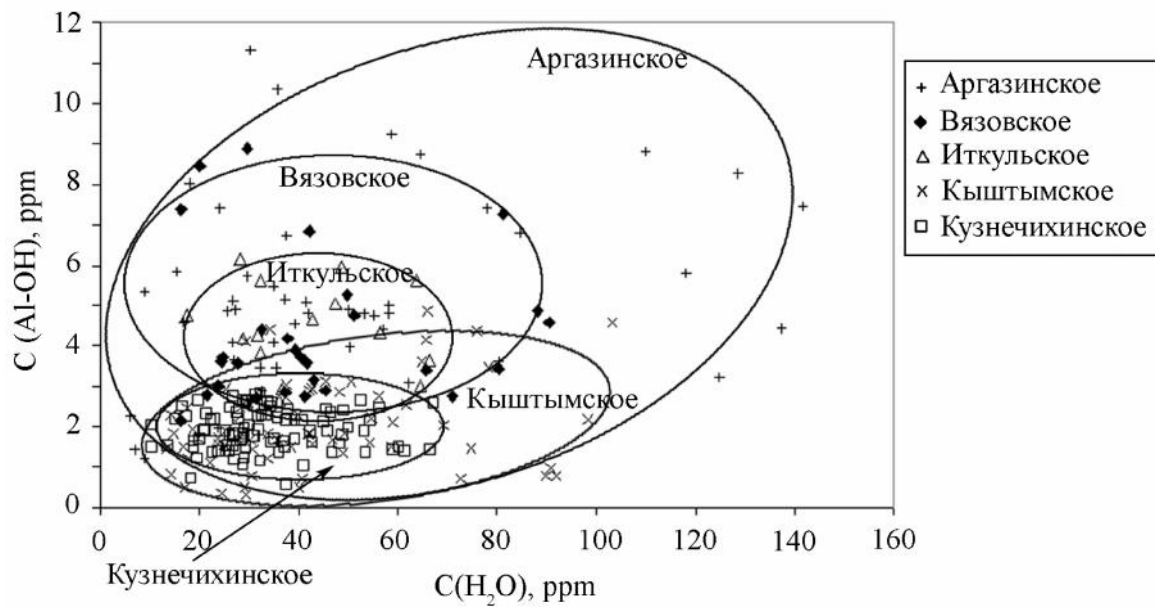
Al-OH 4 ppm,

OH-

2 ppm,

, , 30 ppm

Al-OH,

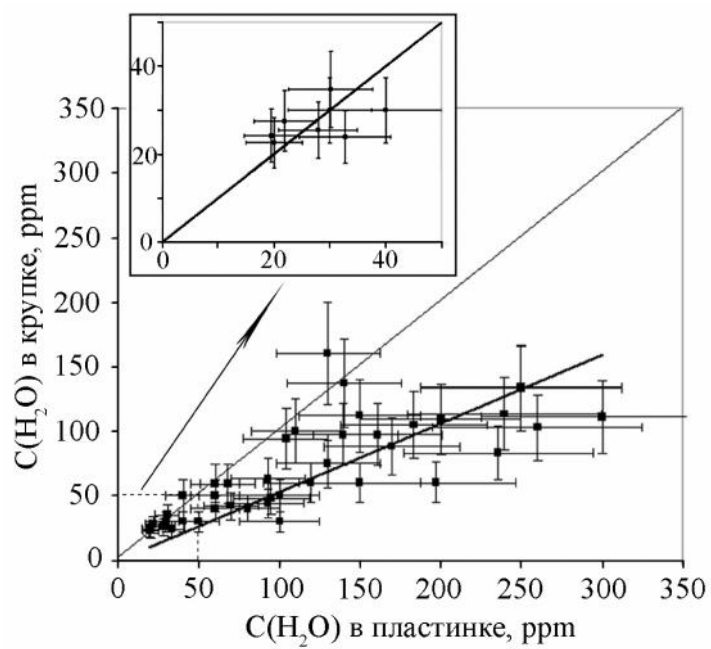


6 -

АИ-ОН

(. 7).

20–40 ppm,

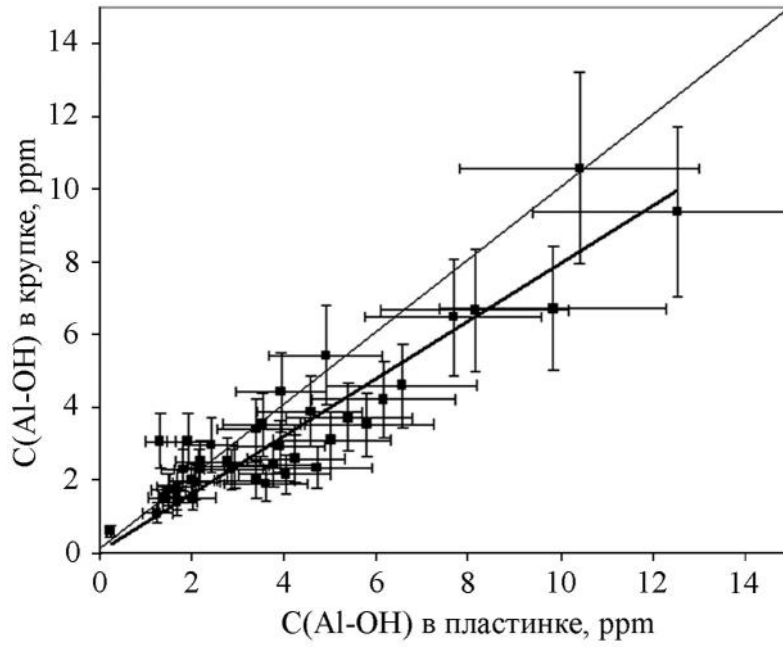


7 -

Al-OH

Al-OH

Al-OH,

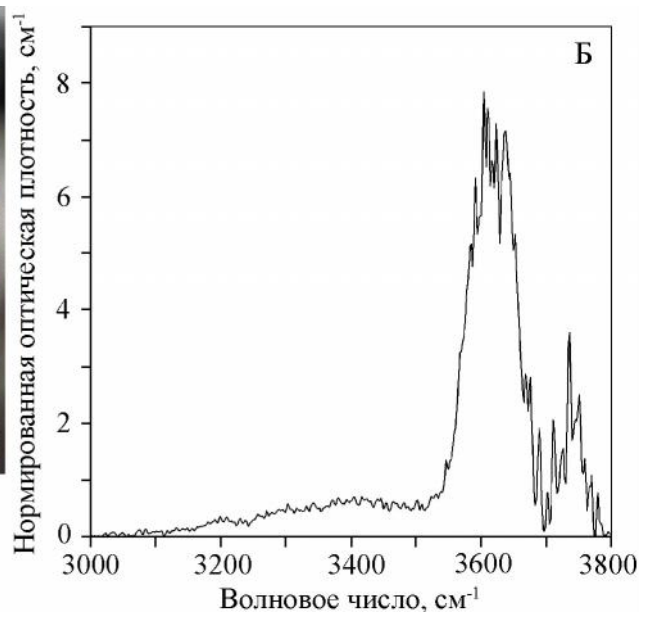
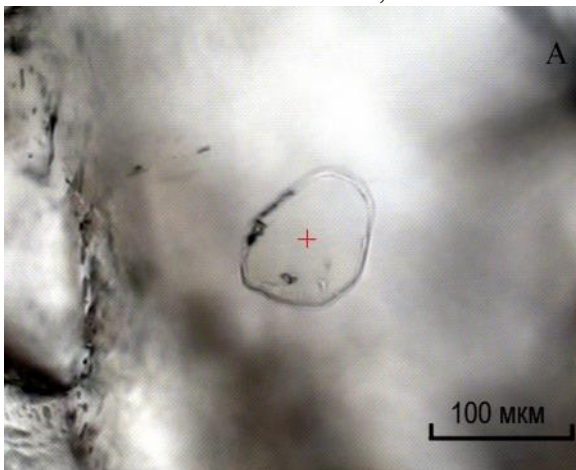


8 –

Al-OH

3740 cm^{-1} (. 9).

3600 cm^{-1}

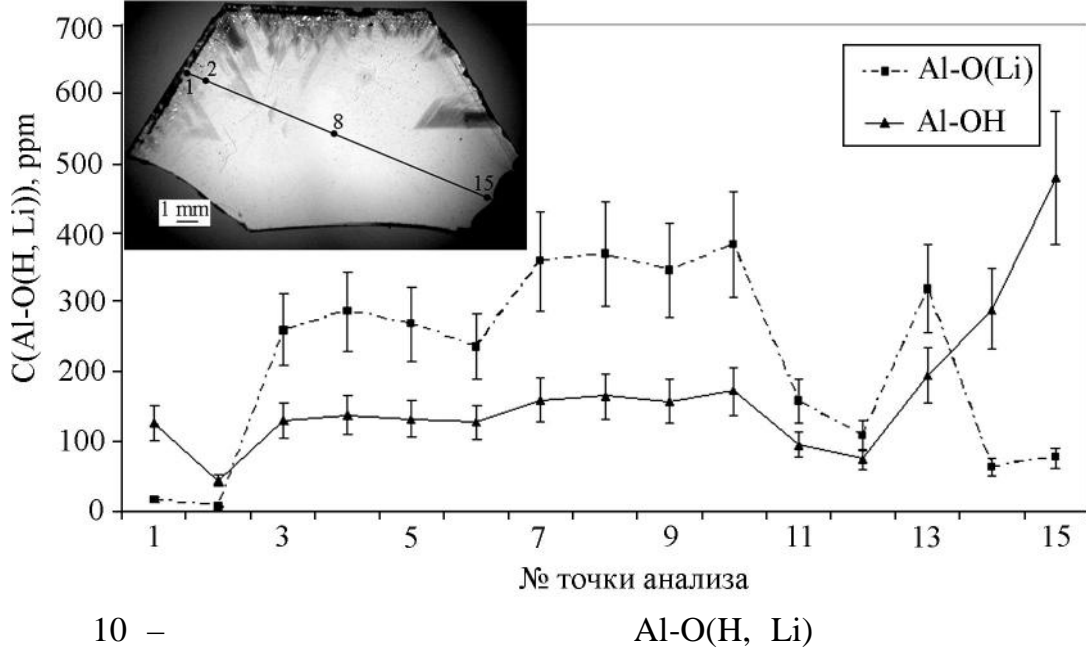


9 –

(), .191-1,

Al-O(Li)

Al-OH. 11, 12
Al-OH Al-O(Li) (. 10).



10 -

Al-O(H, Li)

11

3400 ⁻¹

⁻¹

3220 ⁻¹

3378 ⁻¹

3150

(3366

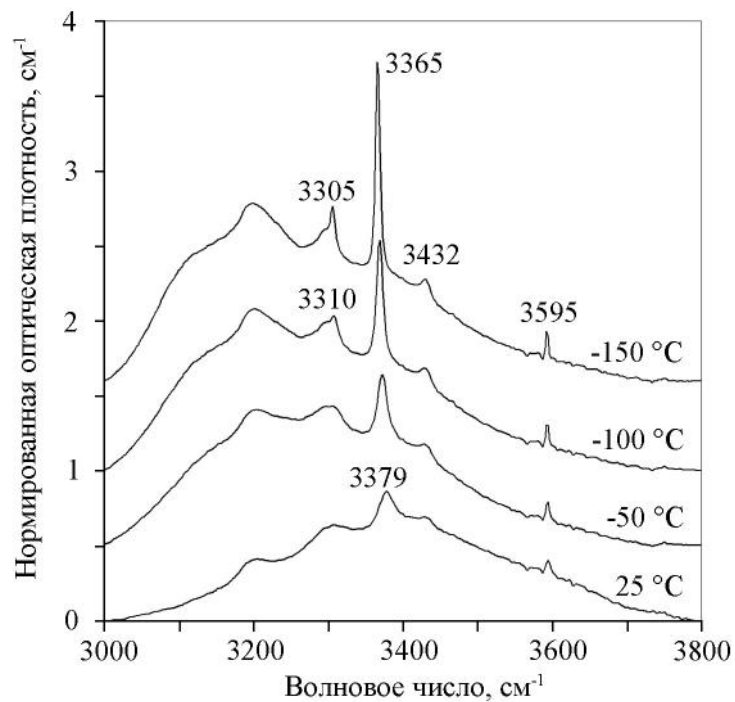
⁻¹

-150 °),

3305 ⁻¹

3432 ⁻¹

Al-OH.



11 -

).

(. 523-1,

3378 ⁻¹

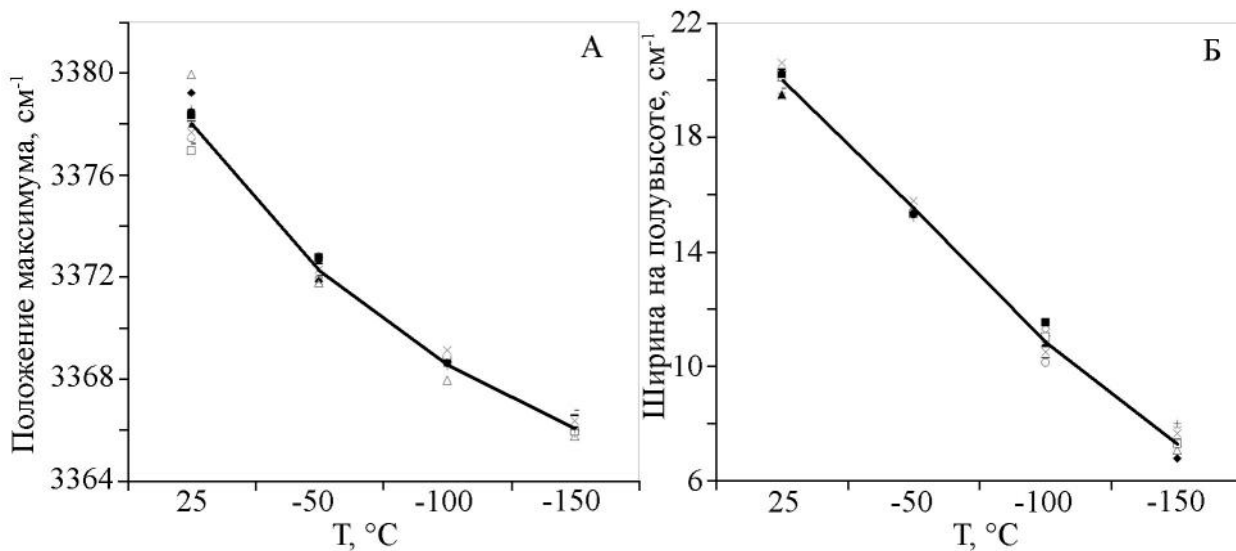
12

Al-OH.

3378 ⁻¹

3366 ⁻¹.

20 7,5 ⁻¹.



12 -

()

()

Al-OH

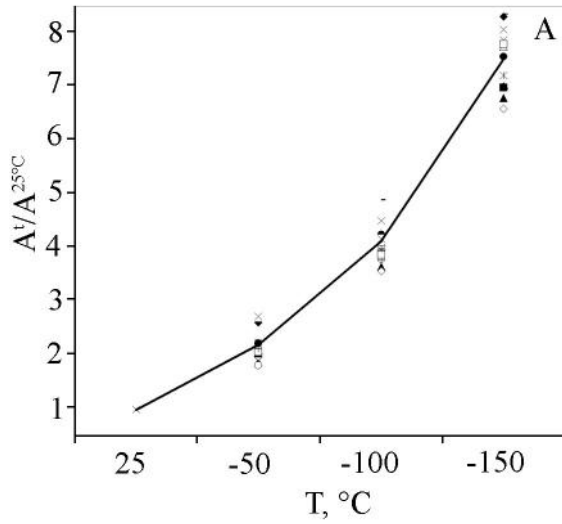
(3378 ⁻¹, 3310 ⁻¹
~ 7,5

(A^t/A^{25°C})
3432 ⁻¹
-150 °C,

c

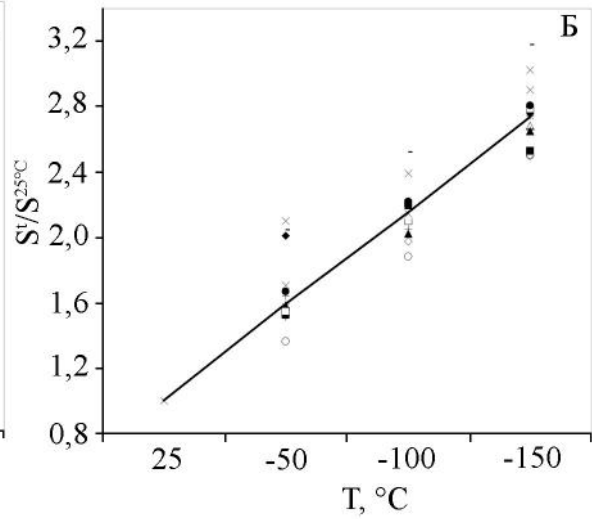
Al-OH

$\sim 2,7$ $-150 \text{ } ^\circ\text{C}$ (S^t/S^{25C})
 $\cdot 13).$
 3378 $-1, 3310$ -1 3432 $' -1$
 $H-$



13 -

s^t/s^{25C} ()



A^t/A^{25C} ()

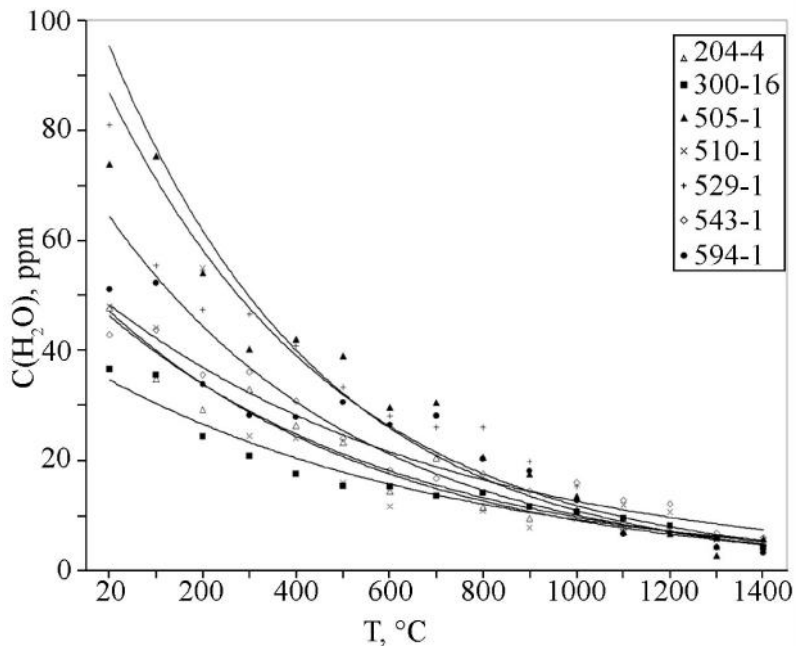
Al-OH

14

1400 °C
 ~ 20 ppm.

- 300 °C.

900 °C,



14 -

204-4, 594-1),
(. 505-1).

(. 300-16, 543-1),

(. 529-1),

(.

()

H₂O

2.

(800-26)

-1

= 40 ppm 50 ppm,

-2

H₂O

, H₂O = 0 ppm 90 ppm,

-1,

30-40

-2,

2 -

(C(H₂O), ppm)

(. 800-26)

(. -1, -2)

| | | | | |
|---------------|-----|-----|-----|-----|
| | | | | |
| 800-26 | 30 | 25 | 20 | 25 |
| -1 | 380 | 340 | 330 | 310 |
| -2 | 370 | 370 | 280 | 280 |

1.

Al-OH

2.

, ICP-MS).

3.

Al-OH

4.

5.

().
Al-OH

6.

1400 °C

900 °C,

– 300 °C.

1200–

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12. . – : . – 2008. – . 283-
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15. , . . :
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| ” | ”. | | . | .- . .1,0. |
| . | . .1,0. | 100 . | . | 545 |

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