

• • , • • • , • • • , • • • ,  
 • • , • • • , • • • , • • • ,  
 • • , • • • , • • • « »

• • • • •  
 : • • • • •

The results of researches of thermodynamically stable barium silicates are given. The base of the thermodynamic data (enthalpies, entropies and equation factors of the thermal capacity) which are necessary for research of the multicomponent systems with barium silicates in their composition is created.

• • • • •  
 , • • • • •  
 , • • • • •

• • • • •  
 , • • • • •

298 ;  $S_{298}^0 -$   $_{298}^0 -$  298 ;  $G_{298}^0 -$

B<sub>5</sub>Si<sub>8</sub>O<sub>21</sub>; B<sub>3</sub>Si<sub>5</sub>O<sub>13</sub>,  
 = f(T),  
 : Ba<sub>2</sub>SiO<sub>4</sub>; BaSiO<sub>3</sub>; Ba<sub>2</sub>Si<sub>3</sub>O<sub>8</sub>; BaSi<sub>2</sub>O<sub>5</sub>;  
 B<sub>5</sub>Si<sub>8</sub>O<sub>21</sub>; B<sub>3</sub>Si<sub>5</sub>O<sub>13</sub>.

$_{298}^0$  [1, 2].  
 . 1. . 1.

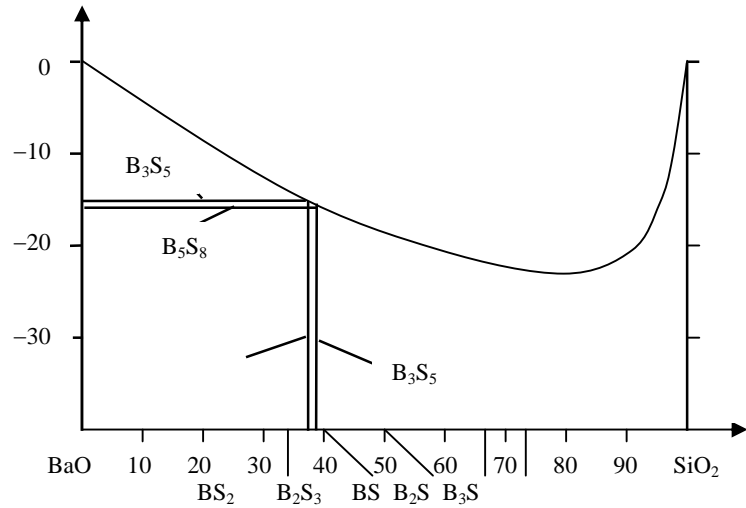
Ba<sub>3</sub>Si<sub>5</sub>O<sub>13</sub>; Ba<sub>5</sub>Si<sub>8</sub>O<sub>21</sub>;  
 • • • • •

[3].

1

	$- \frac{G^0_{298}}{n}$		$- \frac{G^0_{298}}{n}$		$\frac{S^0_{298}}{n}$	
- BaCO <sub>3</sub>	1218,80	5	1138,89	5	112,13	5
- BaCO <sub>3</sub>	-		-		-	
- BaCO <sub>3</sub>	-		-		-	
CO <sub>2</sub>	393,51	5	394,38	5	213,94	5
- SiO <sub>2</sub>	910,44	5	856,05	5	-	
- SiO <sub>2</sub>	911,07	5	856,67	5	42,09	5
Ba <sub>3</sub> SiO <sub>5</sub>	2965,95	5	2822,44	5	252,71	5
Ba <sub>2</sub> SiO <sub>4</sub>	2297,14	2	2183,34	5	182,01	5
BaSiO <sub>3</sub>	1628,33	2	1544,23	5	112,13	5
Ba <sub>2</sub> Si <sub>3</sub> O <sub>8</sub>	4194,33	2	3971,75	5	266,10	5
Ba <sub>5</sub> Si <sub>8</sub> O <sub>21</sub>	10583,26	6	-		645,93	6
Ba <sub>3</sub> Si <sub>5</sub> O <sub>13</sub>	6541,26	6	-		437,23	6
BaSi <sub>2</sub> O <sub>5</sub>	2552,99	2	2414,50	5	153,97	5

U H / n,



. 1.

[4],

. 1.

[7]

= f(T)

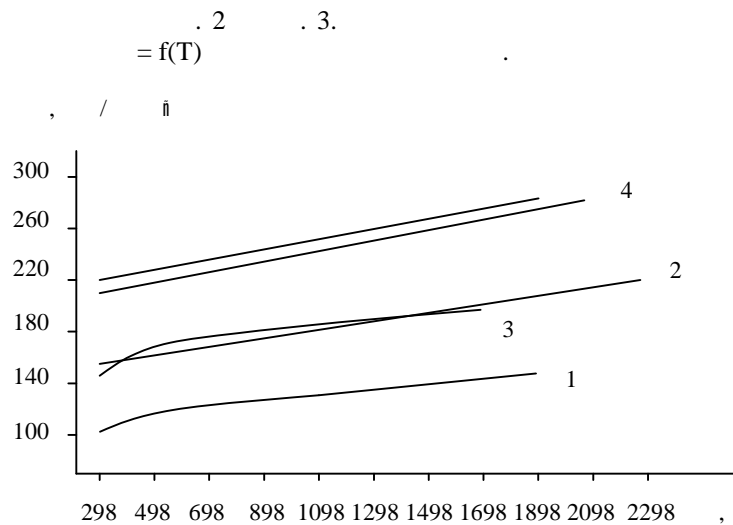
= f(T) [6]:

$$\begin{aligned}
 \text{Ba}_3\text{SiO}_5: &= 186,0206 + 0,0456 (298 - 2073) \\
 \text{Ba}_2\text{SiO}_4: &= 144,348 + 0,0335 (298 - 2233) \\
 \text{BaSiO}_3: &= 102,508 + 0,0247 (298 - 1877) \\
 \text{Ba}_2\text{Si}_3\text{O}_8: &= 211,4175 + 0,0384 (298 - 1723) - 70290 \cdot 10^{-5} \\
 \text{Ba}_5\text{Si}_8\text{O}_{21}: &= 181,11 + 0,02785 (298 - 1719) - 4063246,2 \cdot 10^{-5} \\
 \text{Ba}_3\text{Si}_5\text{O}_{13}: &= 107,57 + 0,02817 (298 - 1696) - 197565,1 \cdot 10^{-5} \\
 \text{BaSi}_2\text{O}_5: &= 172,7155 + 0,0131 (298 - 1703) - 2894490 \cdot 10^{-5}
 \end{aligned}$$

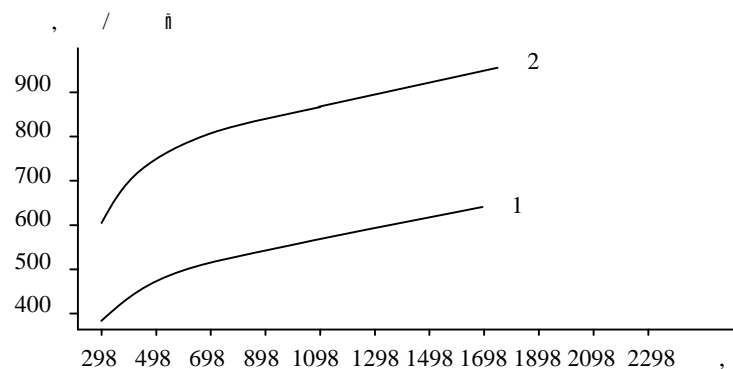
. 2.

2

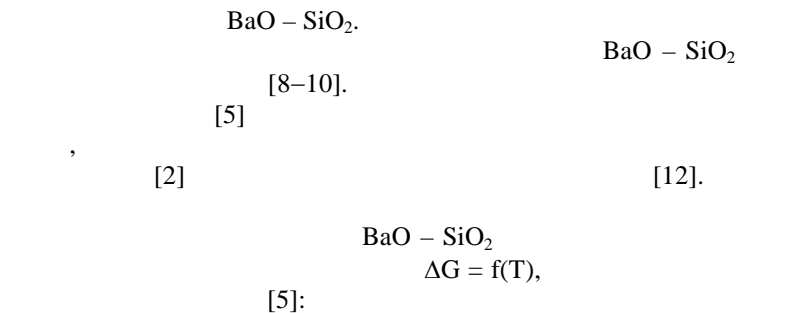
	$= a + b + c \cdot 10^{-5}$					
		$b \cdot 10^3$	$c \cdot 10^{-5}$			
- BaCO <sub>3</sub>	86,96	48,99	11,97	5	1079	5
- BaCO <sub>3</sub>	154,91	-	-	5	1079-1241	5
- BaCO <sub>3</sub>	163,29	-	-	5	1241	5
CO <sub>2</sub>	44,14	9,04	8,54	5	298-2500	5
$\alpha$ - SiO <sub>2</sub>	60,29	8,17	-	5	848-2000	5
- SiO <sub>2</sub>	46,94	34,31	11,30	5	298-848	5
Ba <sub>3</sub> SiO <sub>5</sub>	187,07	63,26	17,57	5	2073	10
Ba <sub>2</sub> SiO <sub>4</sub>	144,35	33,47	-	5	2088-2233	11
BaSiO <sub>3</sub>	109,87	18,20	18,79	5	710-1877	8
Ba <sub>2</sub> Si <sub>3</sub> O <sub>8</sub>	211,42	38,41	0,703	5	550-1723	8
Ba <sub>5</sub> Si <sub>8</sub> O <sub>21</sub>	181,11	27,85	40,632	6	298-1719	6
Ba <sub>3</sub> Si <sub>5</sub> O <sub>13</sub>	107,57	28,17	21,975	6	298-1696	6
BaSi <sub>2</sub> O <sub>5</sub>	172,72	13,07	28,94	5	565-1703	8



1 - B SiO<sub>3</sub>; 2 - Ba<sub>2</sub>SiO<sub>4</sub>; 3 - BaSi<sub>2</sub>O<sub>5</sub>; 4 - Ba<sub>3</sub>SiO<sub>5</sub>; 5 - Ba<sub>2</sub>Si<sub>3</sub>O<sub>8</sub>



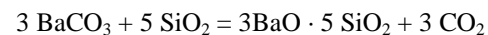
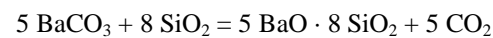
1 - Ba<sub>3</sub>Si<sub>5</sub>O<sub>13</sub>; 2 - Ba<sub>5</sub>Si<sub>8</sub>O<sub>21</sub>



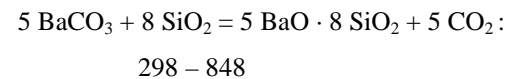
$$\Delta G(T) = \Delta G_{298}^0 - \Delta G_{298}^0 \ln T - \frac{1}{2} b T^2 - \frac{1}{2} \Delta \Delta^{-1} + y T \quad (1)$$

$$\Delta G_{298}^0 = \Delta G_{298}^0 - \frac{1}{2} b 298^2 - \frac{1}{2} \Delta \Delta^{-1} + y 298 \quad (2)$$

$$y = \frac{\Delta G(T) - \Delta G_{298}^0 + \frac{1}{2} b T^2 + \frac{1}{2} \Delta \Delta^{-1} - T y}{T - 298} \quad (3)$$



1079 1241 .  
BaCO<sub>3</sub>  
ΔG=f(T)



$$\Delta G(T) = 601514,65 - 168,44 \ln T + 178,76 \cdot 10^{-3} T^2 + 31,2 \cdot 10^5 T^{-1} + 239,36$$

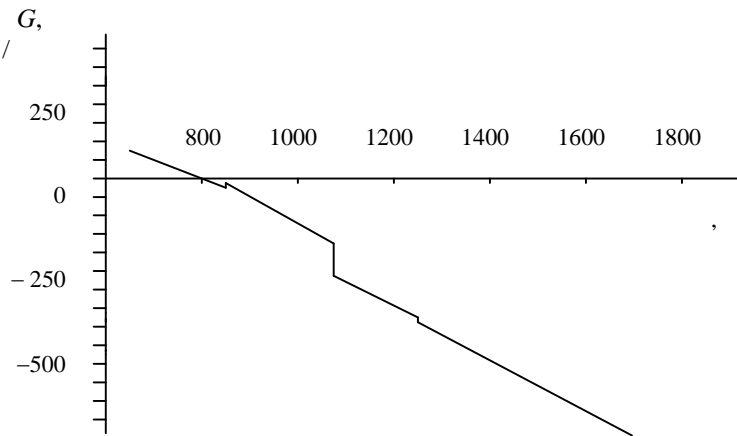
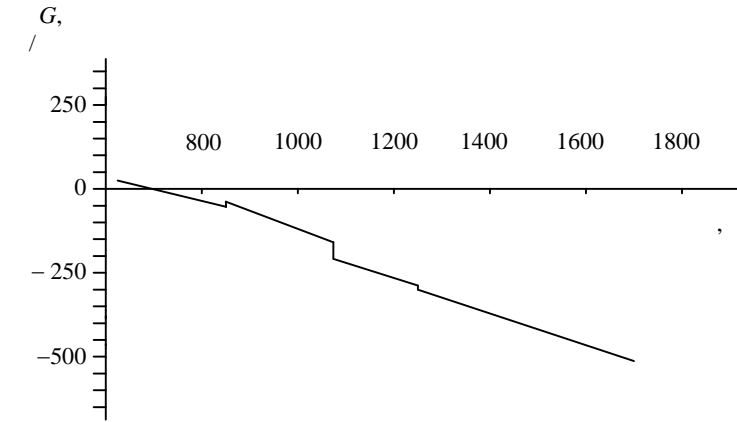
$$\Delta G(T) = 588692,45 - 61,64 \ln T + 73,995 \cdot 10^{-3} T^2 + 76,4 \cdot 10^5 T^{-1} - 362,31$$

$$1079 - 1241$$

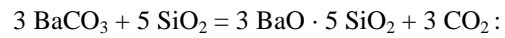
$$\Delta G(T) = 737517,4 + 277,86 \ln T - 48,355 \cdot 10^{-3} T^2 + 106,3 \cdot 10^5 T^{-1} - 2820,41$$

1241 – 1700

$$\Delta G (T) = 774796,8 + 319,71 \ln T - 48,355 \cdot 10^{-3} T^2 + 106,3 \cdot 10^5 (T)^{-1} - 3159,31$$



4.  $Ba_5Si_8O_{21}$  –  $Ba_3Si_5O_{13}$  :



298 – 848

$$\Delta G (T) = 364577 - 87,09 \ln T + 86,71 \cdot 10^{-3} T^2 + 12,56 \cdot 10^5 (T)^{-1} + 14,03$$

848 – 1079

$$\Delta G (T) = 356543,7 - 20,34 \ln T + 21,23 \cdot 10^{-3} T^2 + 40,81 \cdot 10^5 (T)^{-1} - 362,01$$

1079 – 1241

$$\Delta G (T) = 445838,6 + 183,36 \ln T - 52,183 \cdot 10^{-3} T^2 + 58,75 \cdot 10^5 (T)^{-1} - 1836,87$$

1241 – 1700

$$\Delta G (T) = 468206,4 + 208,47 \ln T - 52,183 \cdot 10^{-3} T^2 + 58,75 \cdot 10^5 (T)^{-1} - 2040,21$$

1. ... 1985. – 136 2. Barany R., King E.G., Todd S.S. Heat of formation of crystalline silicates of strontium and barium // J. Amer. Chem. Soc. – 1957. – Vol. 79. – P. 3639-3641. 3. ... 1970.-541 4. ... 1981.- 180 5. ... 1986. – 408 6. ... BaO-Fe<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>: ... 05.17.11. – ... 2003. – 202 7. ... 1962. – 223 8. ... 1957. – ... 2, ... 5. – ... 1001-1007 9. ... 1957. – ... 2, ... 10. – ... 2438 – 2448 10. ... 1963. – ... 308-321. 11. ... Ca<sub>2</sub>SiO<sub>4</sub> – Ba<sub>2</sub>SiO<sub>4</sub> // 1965. – ... 1. – ... 126-130. 12. ... 2002. – ... 16. – ... 71-76.

21.04.06