

- -
 . . . ,
 - (Ar, N₂, He),
 ().
 , , , , .
 . - - :
) (95 %; - ;
 , ,
 (Mn, Ni, Cr, Ti), Si, P, S. ,
 (~ 4000) S P ()
 . - -
 :

$$N_2(b) + k_1 O_2 \rightarrow k_2 NO'$$

$$(b) + k_3 O_2 \rightarrow k_4 CO + k_5 CO_2,$$

$$H_2(b) + k_6 O_2 \rightarrow k_7 H_2 + k_8 H_2O'$$
 k₁...k₈ - ,
 , (-
)
 2 2 , . .

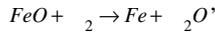
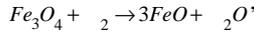
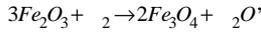
$$k_5 = 0, \quad k_8 = 0.$$

$$(b) + \frac{1}{2} O_2 \rightarrow CO, \quad K_p = \frac{P_{CO}}{P_{O_2}^{1/2}}, \quad \lg K_p = 4,692 + \frac{5772}{T}.$$

$$3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2, \quad K_p = \frac{P_{CO_2}}{P_{CO}}, \quad \lg K_p = 4,31 + \frac{558}{T},$$

$$Fe_3O_4 + CO \rightarrow 3FeO + CO_2, \quad K_p = \frac{P_{CO_2}}{P_{CO}}, \quad \lg K_p = 2,08 - \frac{1847}{T},$$

$$FeO + CO \rightarrow Fe + CO_2, \quad K_p = \frac{P_{CO_2}}{P_{CO}}, \quad \lg K_p = -1,25 + \frac{1060}{T}.$$



(III)

(II)

FeO Fe

$$K_p = \frac{\% V_{CO_2}}{\% V_{CO}}$$

$$\% V_{CO_2} \quad \% V_{CO}$$

(, , , 2, 2

2).

$$\frac{\% V_{(CO_2)} \times \% V_{(sum)}}{V_{(M)}} = \frac{\% CO_2 \times m_{(sum)}}{M_{(CO_2)}},$$

$$V_{(sum)} m_{(sum)} - \quad ; V_{(M)} -$$

$$; M_{(CO_2)} - \quad 2,$$

$$\% V_{(CO_2)} = \frac{\% CO_2 \times m_{(sum)}}{V_{(sum)} \times V_{(M)}} \times M_{(CO_2)}, \quad \% V_{(CO)} = \frac{\% CO \times m_{(sum)}}{V_{(sum)} \times V_{(M)}} \times M_{(CO)}.$$

$$K_P = \frac{(\% CO_2 \times m_{(sum)}) / (V_{(sum)} \times V_{(M)} / 44)}{(\% CO \times m_{(sum)}) / (V_{(sum)} \times V_{(M)} / 28)} = \frac{7 \times \% CO_2}{11 \times \% CO}.$$

$$\% CO_2 / \% CO$$

$$\lg \left(\frac{\% CO_2}{\% CO} \right) = 4,5 - \frac{558}{t + 273}.$$

$$K_P = \frac{\% V_{(H_2O)}}{\% V_{(H_2)}} = \frac{2 \times \% H_2O}{18 \times \% H_2} = \frac{1}{9} \left(\frac{\% H_2O}{\% H_2} \right).$$

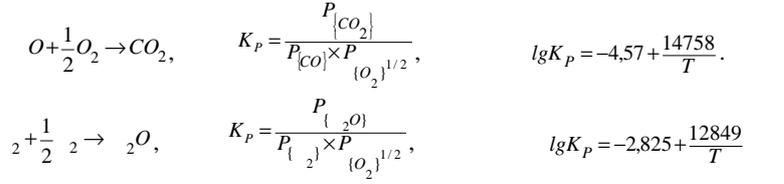
$$\% H_2O / \% H_2:$$

$$\lg \left(\frac{\% H_2O}{\% H_2} \right) = 7 - \frac{2468}{t + 273}.$$

$$\frac{\% CO_2}{\% CO} < 10^{-1,0235 + \left(\frac{101835}{t + 273} \right)} \quad \frac{\% H_2O}{\% H_2} < 10^{1,4815 - \left(\frac{891}{t + 273} \right)}.$$

$$Q_{(1)} + Q_{(2)} = Q_{(1)} + Q_{(2)} + Q_{(3)}, \quad (5.124)$$

$$Q_{(1)} - Q_{(2)} = \dots$$



...

1) $\sum \% R_{(i)} = 100\%$;

2)
$$\sum (\% Fe_{(i)} \times P_{(i)}) = \sum (\% F_{(i)} \times P_{(i)});$$

3)
$$\sum (\% O_{2(i)} \times P_{(i)}) = \sum (\% O_{2(i)} \times P_{(i)});$$

4)
$$\sum (\% O_{2(i)} \times P_{(i)}) = \sum (\% O_{2(i)} \times P_{(i)});$$

$$: \frac{\% CO_2}{\% CO} = const_1^*$$

* -

5)

:

$$\sum (\% \text{ }_{2(i)} \times P_{(i)}) = \sum (\% \text{ }_{2(i)} \times P_{(i)});$$

6)

:

$$\frac{\% \text{ }_2}{\% \text{ }_2} = const_2^{**}$$

** -

(4);

7)

$$: = \frac{\% Fe_{()}}{\% Fe_{()}}.$$

);

”

$$\frac{t}{t} \approx \frac{\mu a}{gd^2 l (\text{ } -)}$$

t -

, ; t -

, ;

μ -

, / 2; g -

, ; d -

, ; l -

, ;

, / 3.

$\frac{t}{t} \gg 1,$

$\frac{t}{t} \ll 1 -$

; $\frac{t}{t} \approx 1 -$

Fe, FeO, Fe3O4, Fe2O3, Al Al2O3.

”Fe-Al2O3”, ”Al-FeO”, ”Al-Fe3O4” ”Al-Fe2O3”

.5.40.

Al2O3,

