

[1] , -
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 : 80...85 1 -
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 / , -2013» [2].

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[3]. , -
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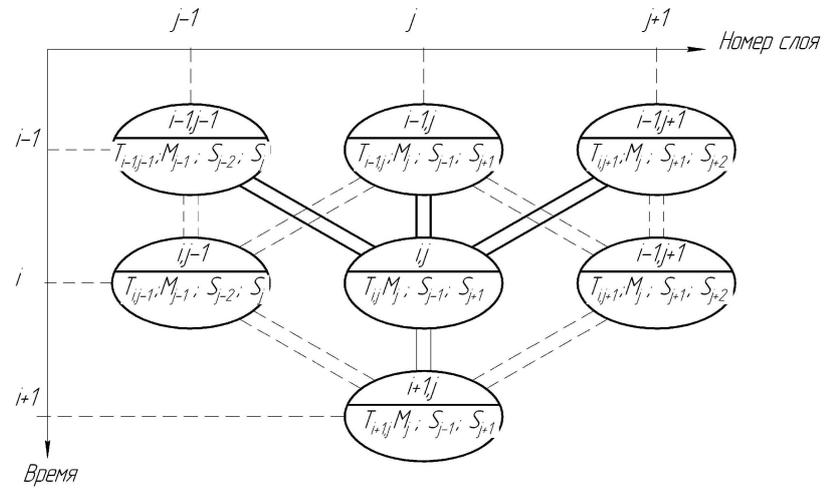
: ,
 d_p ,
 ,
 T_R ,
 T_R ,

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 , -
 , -
 , -

, -
 , -
 , -
 , -
 Δt , -

, -
 , -
 , -

r_0 -
 ur , Δt -
 ut . Δt , ur , ut -
 ur , , , . 1.



. 1 -
 , , :
 $i, j -$; $T_{i,j} -$, i , $j, M_j -$
 $j, S_{j,j-1} -$,
 $S_{j,j+1} -$,
 [5] :

$$uQ = t \cdot S(r) \frac{uT}{ur} ut, \quad (1)$$

$t -$; $S(r) -$
 $S(r) = 2fr^2$; $\frac{uT}{ur} -$
 $ut -$

$(i-1, j-1 \quad i-1, j+1)$, i, j :

$$uQ_{i,j} = t \cdot [S_j (T_{i-1,j-1} - T_{i-1,j}) + S_{j+1} (T_{i-1,j+1} - T_{i-1,j})] \frac{ut}{ur}. \quad (2)$$

$i, j,$
 $i, j:$

$$uT_{i,j} = \frac{uQ_{i,j}}{c \dots uV_j}, \quad (3)$$

$c, \dots -$, $uV_j -$ -
 $i, j:$

$$T_{i,j} = T_{i-1,j} + uT_{i,j}, \quad (4)$$

$T_{i-1,j} -$,
 $t=0 (\dots)$, -
 (2), (3), (4):

$$T_{i,j} = T_{i-1,j} + \frac{t}{c \dots uV_j} [S_j(T_{i-1,j+1} - T_{i-1,j}) - S_{j-1}(T_{i-1,j} - T_{i-1,j+1})] \frac{ut}{ur}. \quad (5)$$

(2) :

$$uQ_{i,j} = t \cdot S_{j+1} \frac{T_{i-1,j+1} - T_{i-1,j}}{ur} ut. \quad (6)$$

[6],

$\Delta t:$

$$\Delta Q_i = v \cdot \dagger \cdot S_p (T_{i-1,p}^4 - T_R^4) \Delta t, \quad (7)$$

$v -$; $\dagger -$; $T_{i-1,p} -$ -
 $t=0 (\dots)$; $T_R -$ -
 $i-$:

$$T_{i,p} = T_{i-1,p} + \frac{\Delta Q_i}{c \dots V_p}. \quad (8)$$

(5), (6), (7), (8),

$T_0 = 20 \text{ }^\circ\text{C} -$
 $T_R = 1200 \text{ }^\circ\text{C} -$

$$t = 60 \quad / \cdot -$$

$$c = 1,256 \cdot 10^3 \quad / \cdot -$$

$$\dots = 2,23 \cdot 10^3 \quad / ^3 -$$

$$\dagger = 5,67 \cdot 10^{-8} \quad / ^2 \cdot ^4 -$$

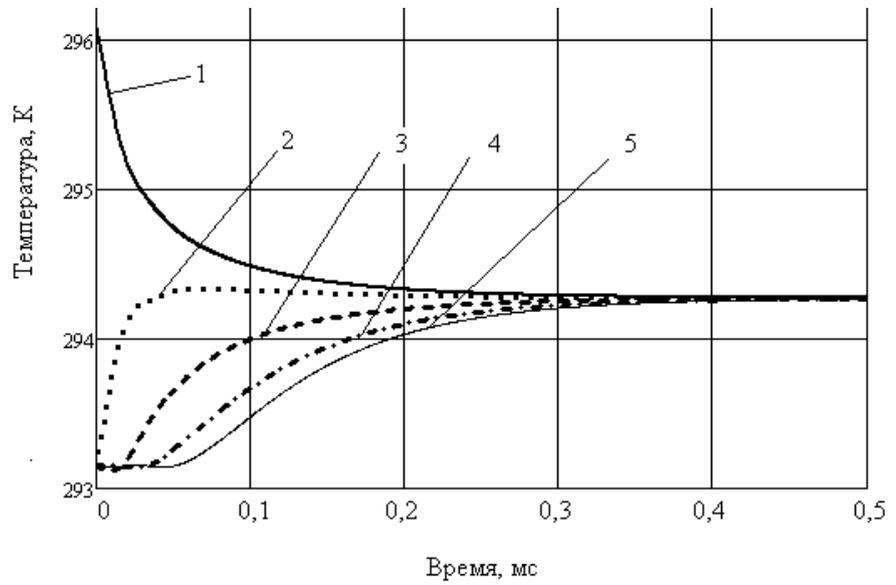
$$v = 78\% \quad -$$

$$r_0 = 2 \cdot 10^{-4} \quad -$$

$$\Delta t = 1 \cdot 10^{-3} \quad -$$

$$ur = 1,6 \cdot 10^{-5}, \quad ur = 4 \cdot 10^{-6} \quad -$$

: 1 - (), 2 - , 3 - , 4 - .2, , 5 - ().



$$t \approx 0,4 \quad (\cdot \cdot \cdot 2),$$

$$\Delta t = 1$$

[5]

(°) (2/)

$$F(k_V, T_{TEG}, T) = F_0 \left[1 + \frac{(k_V)^{\frac{2}{3}} \cdot A \cdot \left(\frac{T}{T_{TEG}} \right)^{0,01}}{1 + C \cdot B^{\frac{T}{T_{TEG}}}} \right], \quad (9)$$

: $F_0 = 5,916 \cdot 10^{-5}$ 2/ -

; k_V -

(); T -

; T_{TEG} -

(); $A = 1,008$; $B = 1,166 \cdot 10^{-4}$; $C = 151,112$ -

(9),

(.3)

. Trace 1 - $T_{TEG} =$

1000° $k_V = 462$; Trace 2 - $T_{TEG} = 800^\circ$ $k_V = 600$; Trace 3 -

$T_{TEG} = 600^\circ$ $k_V = 700$; Trace 4 - $T_{TEG} = 1000^\circ$ $k_V = 350$; Trace 5

[2] $T_{TEG} = 1000^\circ$ $k_V = 462$.

(1) - (8),

(7),

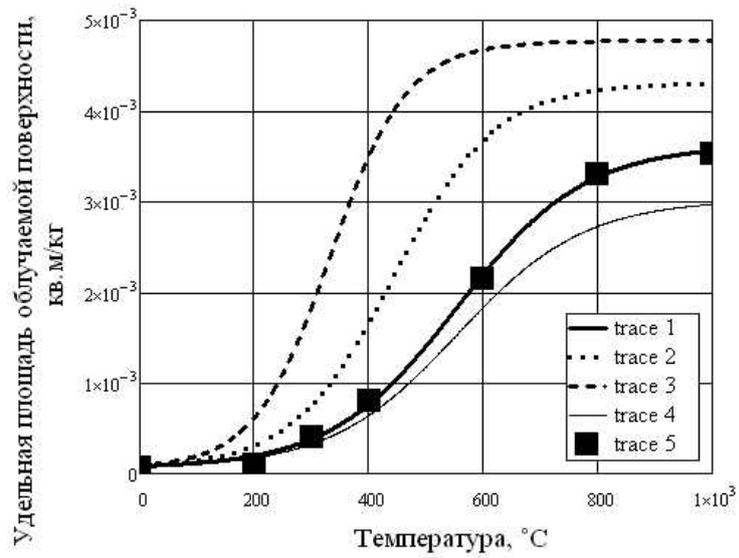
S_p

$F(k_V, T_{TEG}, T)$,

, $T_{TEG} = 1000^\circ$,

.4

0,5



. 3 -

1 - $T_R = 1200^\circ$; 2
 - $T_R = 1600^\circ$; 3 - $T_R = 2000^\circ$; 4 - $T_R = 2400^\circ$; 5 - $T_R = 2800^\circ$.
 (. 4) ,

(1200°) 70°C (2800° . ,

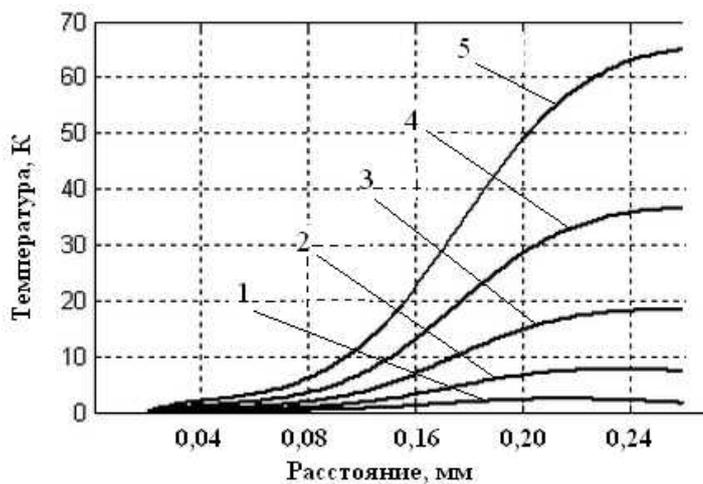
[6].

[6],

$T(t)$:

$$cm_p dT(t) = v \uparrow F(k_V, T_{TEG}, T(t)(T^4(t) - T_R^4)) dt , \quad (10)$$

$$m_p = \dots \cdot \frac{4}{3} f \cdot r_0^3 -$$



. 4 -

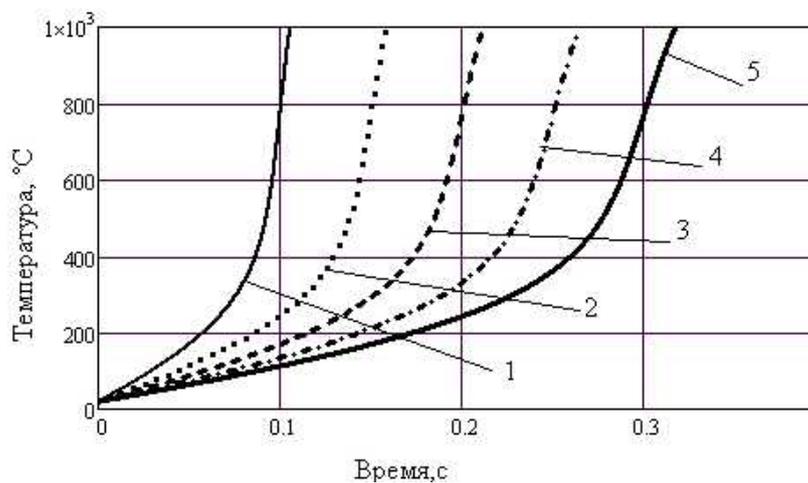
(1) - (8),

. 5

$$T_R = 1200^\circ$$

: 1

- 0,2 ; 2 - 0,3 ; 3 - 0,4 ; 4 - 0,5 ; 5 - 0,6 .

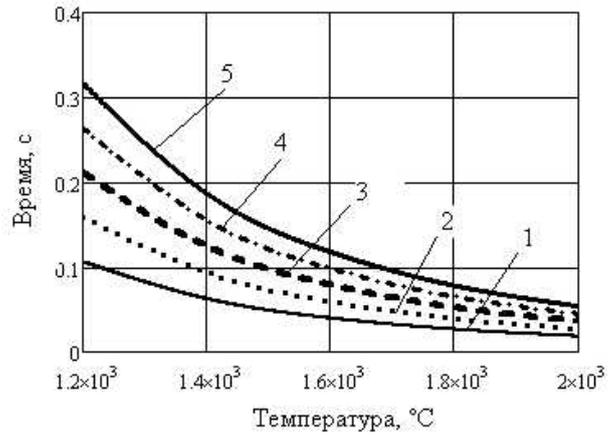


. 5 -

$$T_{TEG}$$

. 6, : 1 - 0,2

; 2 - 0,3 ; 3 - 0,4 ; 4 - 0,5 ; 5 - 0,6 .

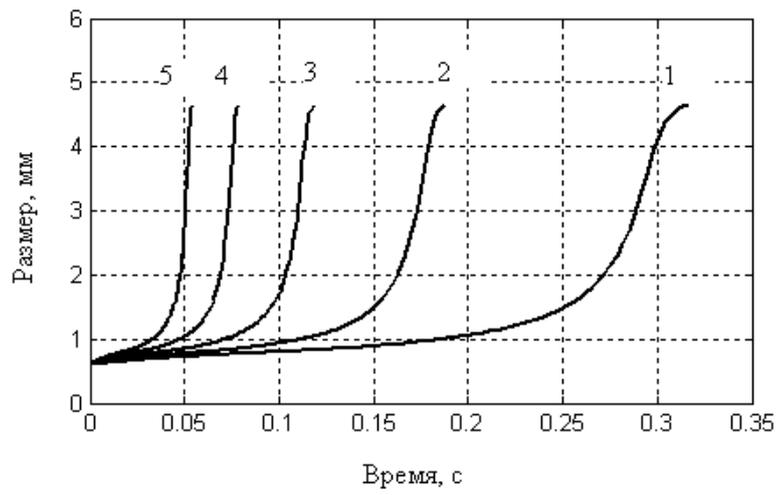


. 6 -

. 7

0,6

: 1 - $T_R=1200^\circ$; 2 - $T_R=1400^\circ$; 3 - $T_R=1600^\circ$; 4 - $T_R=1800^\circ$; 5 - $T_R=2000^\circ$.



. 7 -

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- 1) ;
- 2) ;
- 3) ;

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01.12.2014,
19.05.15