

(« »)

-

03.03.02 –
() –

·

«__»_____201_ .

:
Si(111)

20

BaSi₂

211

(,) . . .

, · · - ·

(,) . . .

, · · - ·

(,) . . .

(« »)

«____»_____201_ .

1. _____ : _____ -
20 BaSi₂ Si(111)
(_____)

2. _____ () 29.06.2016 _____ 3.
: _____ , _____ , _____ -

4. _____ (_____ -
):- _____ -
_____ ; _____
= _____ , _____
_____ ; _____
= _____ - _____

5. _____ : (_____ , _____ , _____ , _____ -
_____ , _____ . .) _____

6. _____ 27.04.2016 _____
: _____
(_____ , _____ , _____ , _____) _____

_____ () 27.04.2016 _____
(_____)

30 , 15 , 3
,15 .

, ,
, ,
, , -
, -
Ba Si (111)
, -
, -

800° , 850° , 900° . , -

800° .

		5
1		7
2		8
3		15
3.1		15
3.2		16
3.3		17
3.4	Si (111)	18
3.5		20
3..6		23
3.7		25
		28
		29

()

[4, 5].

().

12%.

20%.

[9].

- 1) , : -
- 2) ; ; -
- 3) , ; -
- 4) - .

1

,
(BaSi₂).
[9], [10-13]
1,3 BaSi₂, [9, 11, 12, 13]. [10]
BaSi₂ 250
, 5·10¹⁵ 3 820 2 / .
1,3
1,5 . 900 [11]
1,3 , 1,7 . [15]

, - , -
 , - , -
 , Si -
 , - , [1,2],
 , - , -
 :

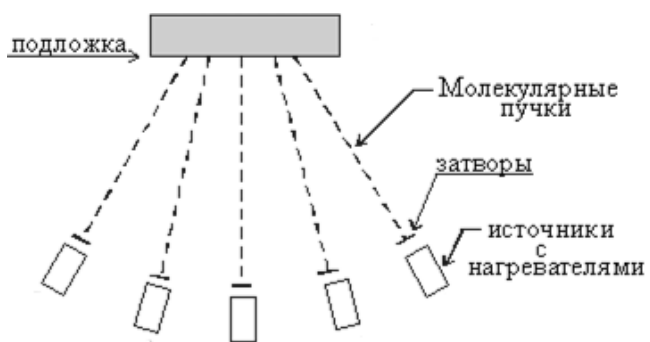
- 1) ;
- 2) ;
- 3) ;
- 4) .

,
 :
 - -
 .
 , .
 - -
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 ,
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 ,
 .

()

1).

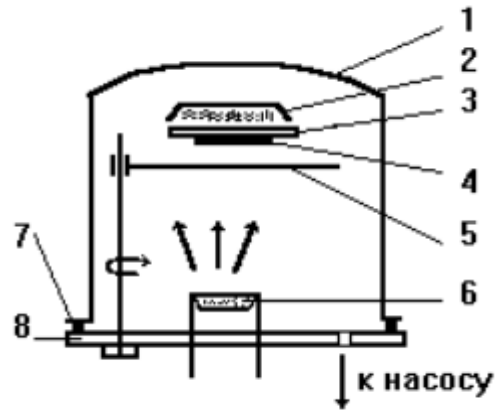
[15].



1 -

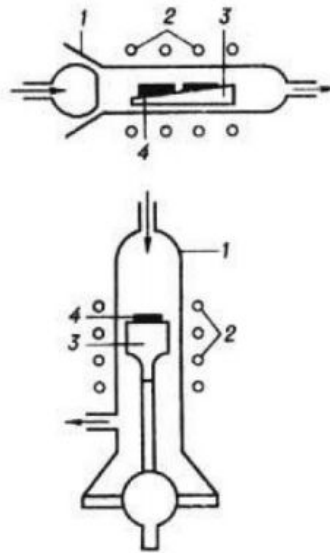
(2).

[15].



- 1— ; 2— ; 3— ; 4—
- ; 5— ; 6— ; 7— ; 8—

800–13000° [15].



3 –

1 –

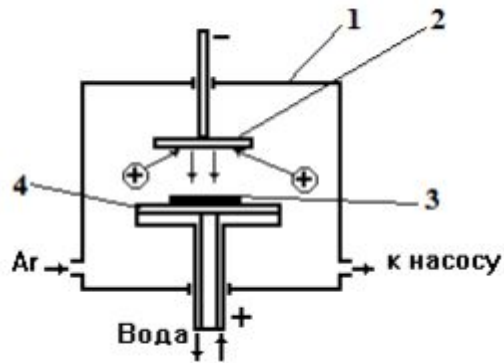
; 2 –

; 3 –

4 –

(4).

[15].



4 –

1 –

; 2 –

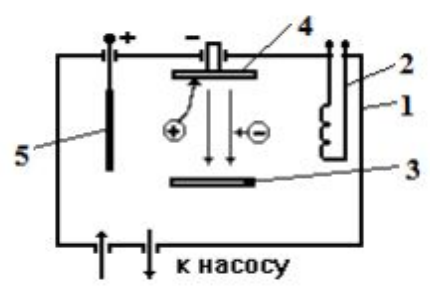
; 3 –

; 4 –

(5).
 10^{-4}

().
 $10^{-1} - 10^{-2}$

[15].



5 — ; 1 — ; 2 — ; 3 — ; 4 — ; 5 —

PLD — pulsed laser deposition) —

6).

1.

;

2.

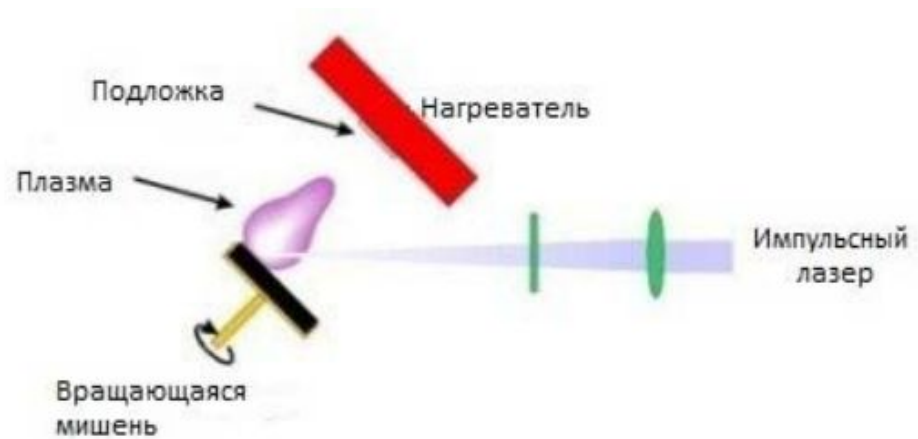
—

;

3.

;

4.



6—

$$\frac{I_s}{I_{S_0}} = (1-x) + xe^{-t/\lambda}, 0 \leq x \leq 1,$$

50%

$$\frac{I_s}{I_{s0}} = (1-x)e^{-t/\lambda} + xe^{-xt/\lambda}, 0 \leq x \leq 1.$$

— , « 2 ».

, ,

0,5 .

-

, [15].

3

3.1

PHI-

590

$1,33 \cdot 10^{-7}$.

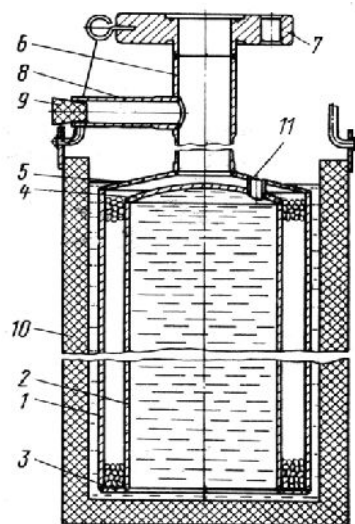
(

)

(7)

$1,33 \cdot 10^{-2}$.

77,4 .



7 -

1 -

; 2 -

; 3 -

; 4,5 -

; 6,8,11 -

; 7 -

; 8 -

; 9 -

; 10

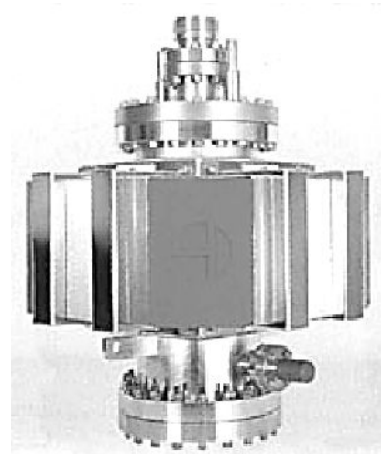
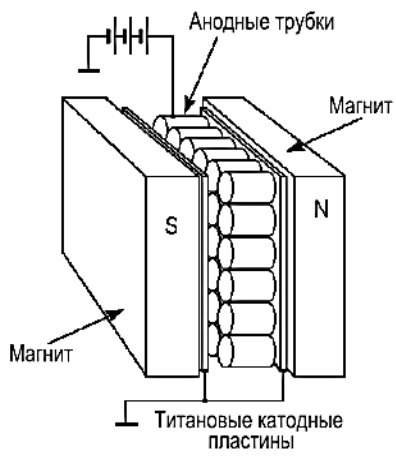
-

$1,33 \cdot 10^{-7}$

:

–

(8).



8 –

$1,33 \cdot 10^{-7}$

300° ,

3.2

Si(111),

-45 (

)

45

(1) , -
 6-8) 1250 ° (3-5 1-2). 600° (

1 – Si(111)

	()	()	()
1	15,40	5,50	0,35
2	15,00	5,37	
3	14,70	5,25	

(Ba) 99,99% (-
).

3.3

«Sycon» (9).



9 –

1)

2)

3)

USB

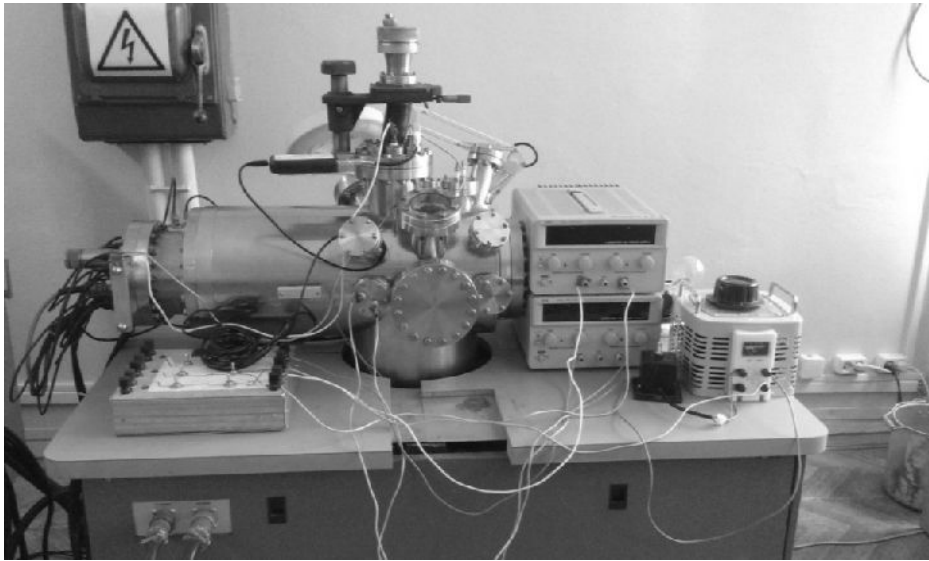
0,1 /

20 .

3.4

Si(111)

PHI-590 (10).



10 – PHI-590

$T_{Si} = 800^\circ, 850^\circ, 900^\circ C$ -

$P = 1,33 \cdot 10^{-7}$.

(,) , , -
:
-
-
Ba
20 Si (111) (-
2).

2 –

	()	- (°C)
1	20	900
2		850
3		800

3.5

Vertex 80

(80v) (11).



11 –

Vertex 80v

Vertex 80v

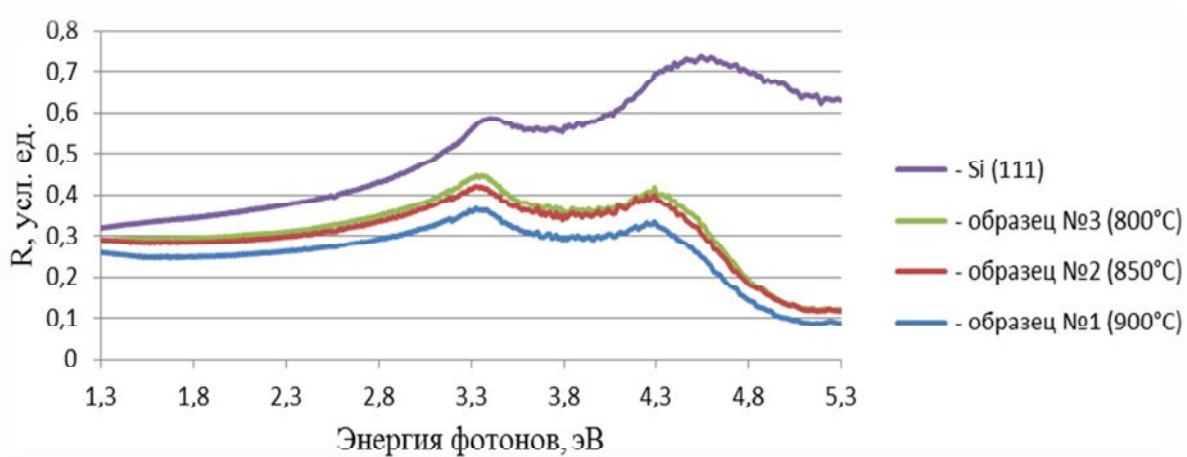
,
 :
 ,
 ,
 ,
 0,20⁻¹,
 ,
 ,
 ,
 0,07
 1.
 -
 ,
 ,
 ,
 ,
 .

, $R -$
 , , $R -$

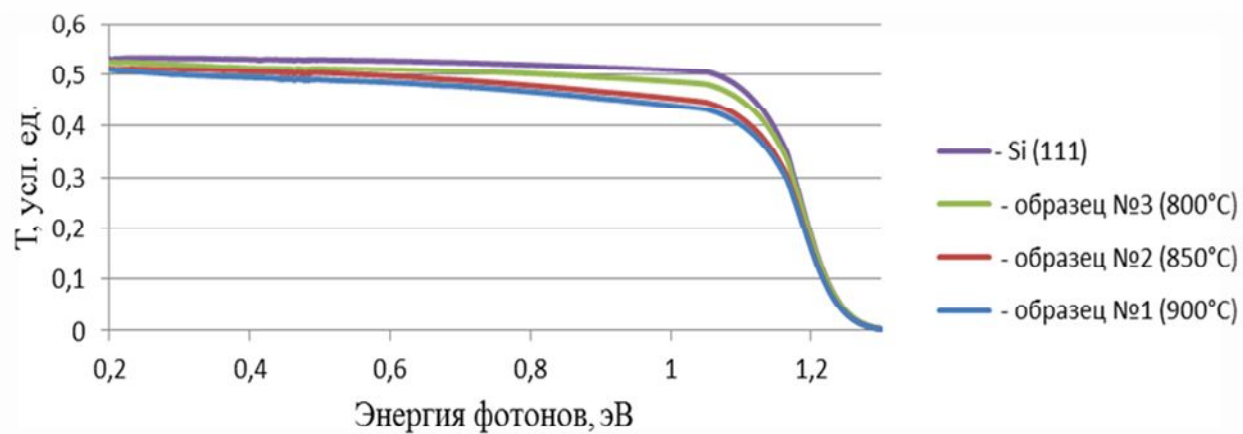
- , -
 , $A_{100\%}$ - (100%).

MicrosoftExcel.

12,13).



12 –



[8, 9],

3,3 4,3

3

3.6

[6].

():

$$\frac{\Delta R}{R_{\text{exp}}} = \frac{R_a - R_s}{R_s}$$

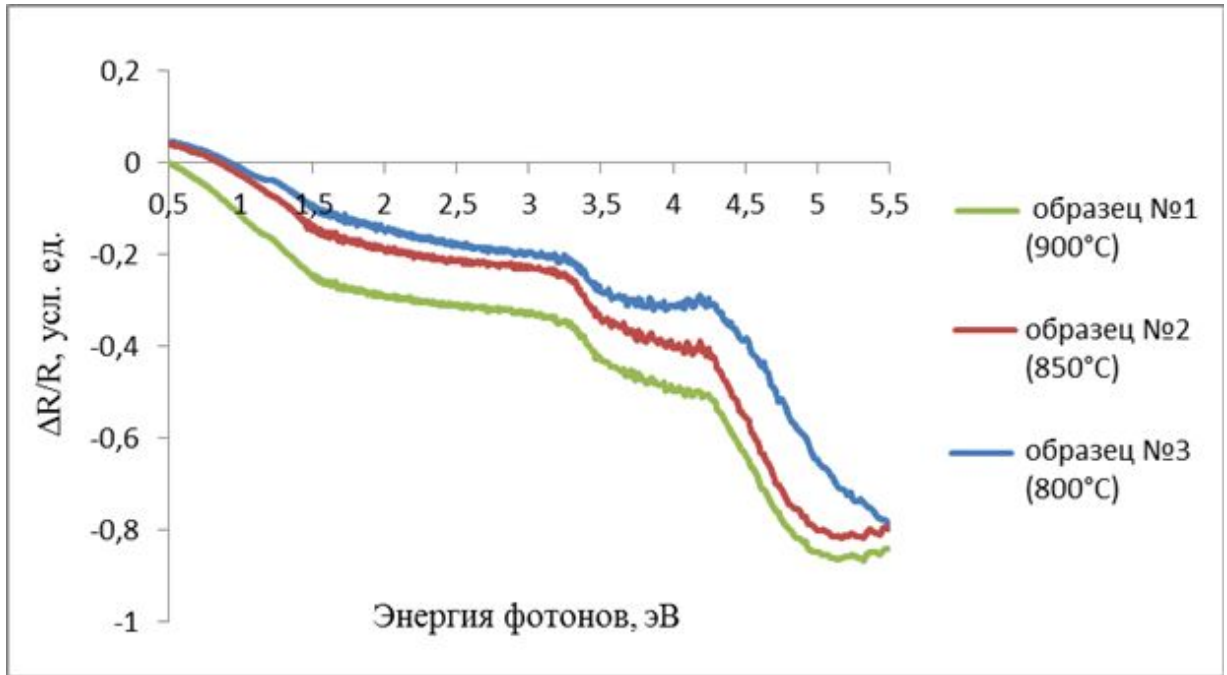
R_s R_a — ()

[7].

()

()).

()).



14 -

14

(R/R)

[8],

3,3 4,2

3.7

Solver 47

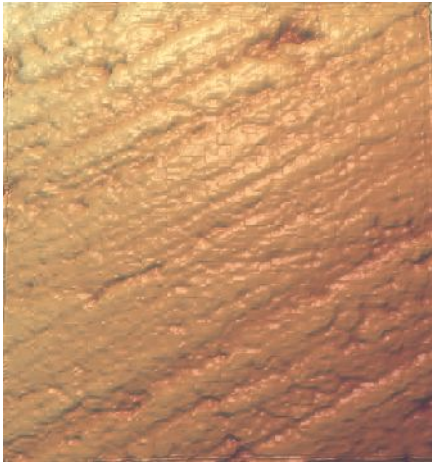
(15).

800 °C,

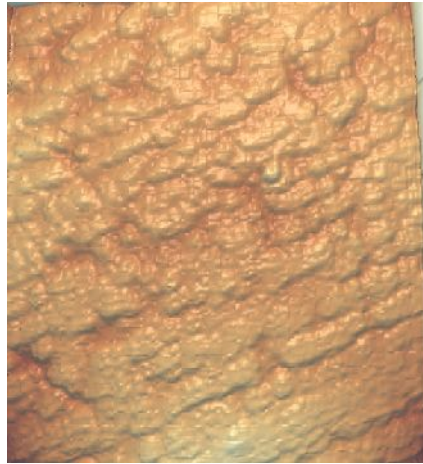
1,

900 °C.

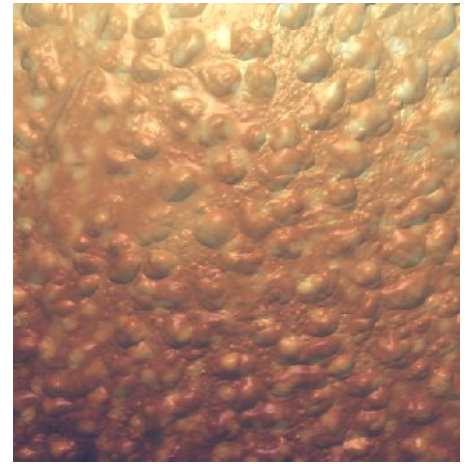
800 °C.



)



)



)

15-

2 850 °C; -

3 800 °C; -
1 900 °C

«FemtoScanOnline».

«FemtoScanOnline»

R_a

$$Ra \approx \sum_{i=1}^n |Y_i|$$

$$R_Z \approx \frac{1}{n(\sum_{i=0}^n h_{imax} - \sum_{i=0}^n h_{imin})}.$$

R_Z

$$R_q \approx \sqrt{\left(\frac{1}{L} \int_0^L r^2\right)(x)}$$

R_q

$$S = \frac{1}{n} \sum_{i=1}^n S_i$$

S

$$S_n = \frac{1}{n} \sum_{i=1}^n S_m$$

S_n

R_{max}

$$R_{sk} = \frac{1}{LR_q^2} \int_0^L r^2(x) dx$$

R_{sk}

.> 1.5

R_q R_a .

«FemtoScanOnline»

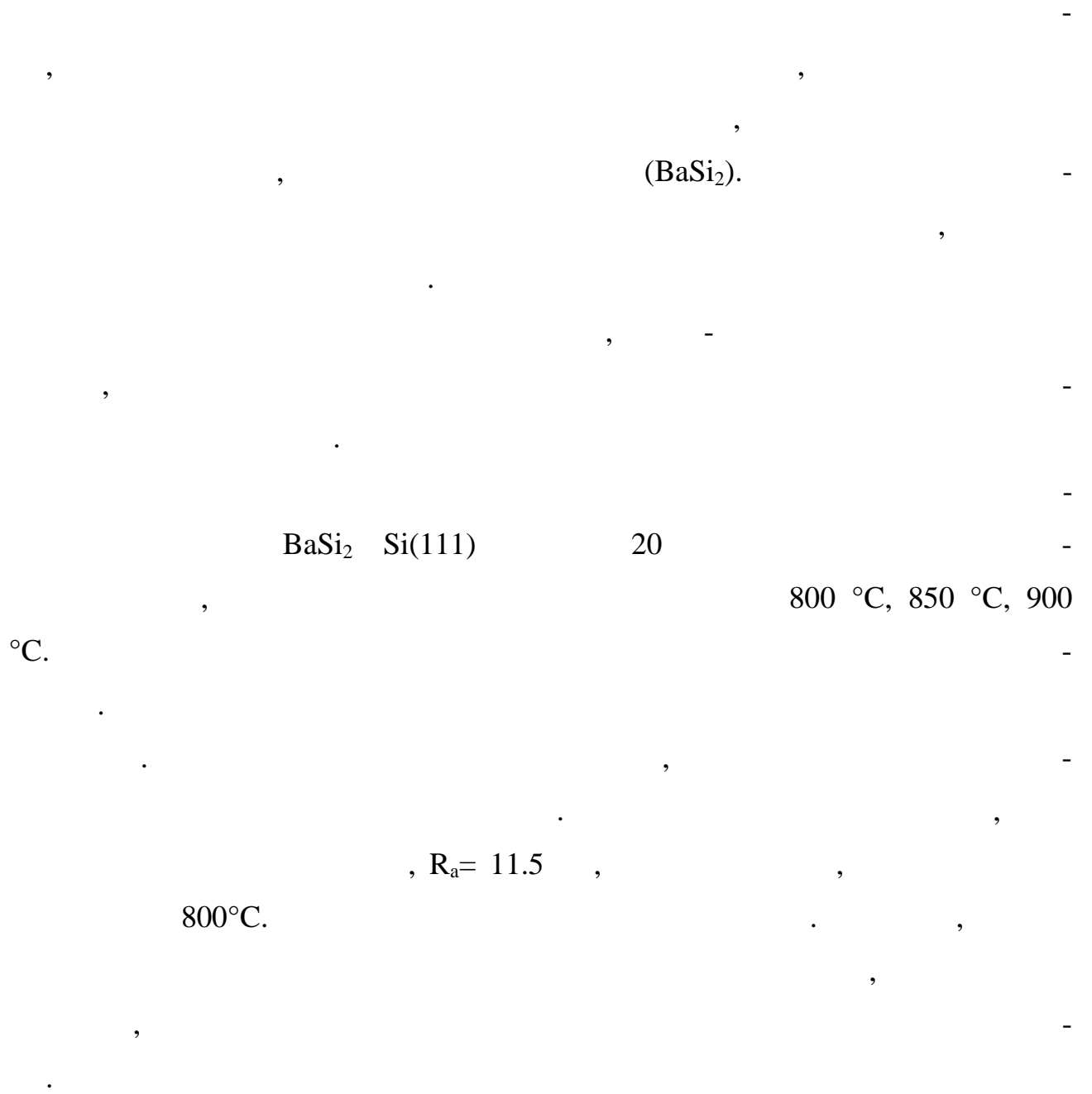
3

«FemtoScanOnline».

3 –

	, (°C)	R_a ,	R_{max} ,	R_q ,	R_{sk} ,
3	800	11,5	63,86	14,28	0,00324
2	850	16,06	92,88	19,34	0,3699
1	900	34,28	169,1	41,98	0,7942

800⁰



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