

30xh

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02.00.06 –

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“18” 2010 . 10

212.166.05

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23, .2.

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“ ” 2010 .



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2,2- (-4-) (-).
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(n > 1.52).

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2,2-(1,2- - -

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-, -, , - (-n, n=1, 2, 3, 4, 8)
() 2,2- (-4-) ,

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

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9,10-

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C=C-

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2,2-(1,2-

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- 2,2'-(1,2- - -() .

IV

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“ 21- ” (, 2007), III IV - “

” (- , 2007, 2008), III

(, 2007), XII X

(, 2007, 2008) , XLVII

“ ” (. , 2008), X “ -2009”

(, 2009), V

(- , 2009).

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(06-03-33061- , 06-03-08186- , 08-03-12090- , 08-03-97055- _ _) -4947.2006.3 -4182.2008.3.

159 , ,
 76 10 .
 126 .

()

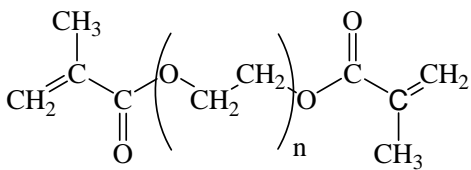
“ ” ,

() .

(-n)

n=1, 2, 3, 4 8 (-

).



(n=1)	($\eta=5.5$ ^{2/})
(n=2)	-2 -
(n=3)	-3 ($\eta=8.5$ ^{2/})
(n=4)	-4 ($\eta=14.4$ ^{2/})
(n=8)	-8 ($\eta=46$ ^{2/})

-n

(, , ,)

(9,10-

(PQ), [PQ]= 1.1×10^{-2} /).

($\lambda=400-750$)
 - -24-250

I=40 .

27.2 / , 40.1 /
 ()

2. 1. 9,10-

() ,

9,10- .

1.

PQ

PQ

(k_H)

	$k_H \times 10^2, ^{-1}$
	0.16
-2	0.35
-3	0.55
-4	0.52
-8	0.55

PQ.

PQ

-n

PQ (k_H),

1. ,

k_H PQ

-2

-3

CH₂-

CH₂-

k_H .

-2

-3,

-3 -

-4 -

-8

-n,

PQ

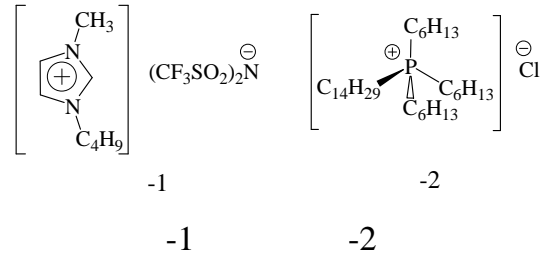
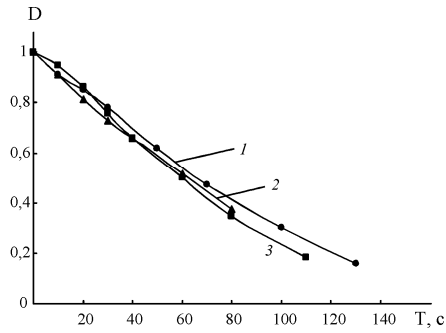
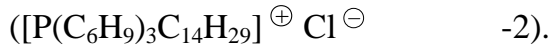
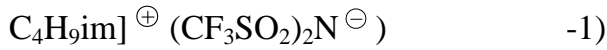
n=3, 4 8

: 1- -

3-

()

([1-CH₃-3-



. 1.

PQ

PQ

-8 (1)

: -1 (10 PQ

-3, 4,

.%) (2),

-2 (2

.%) (3).

8 ,

,

$[PQ]=1 \times 10^{-3}$, I=12 ,

(. 1).

2.

9,10-

(

$(w/[M])$.

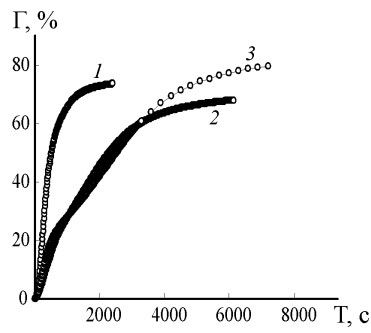
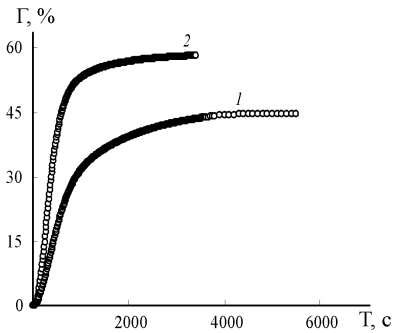
-2

-3

S-

(. 2,).

:



-4

-8 (. 2,)

$w/[M]=f()$

. 2.

4

-8

(1),

-2 (2);)

-3 (1),

-4 (2),

-8 (3)

68 80%

-4

-8,

-2,

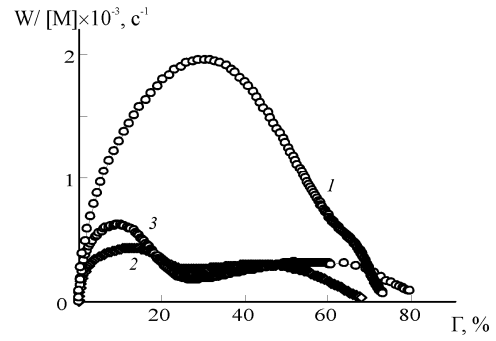
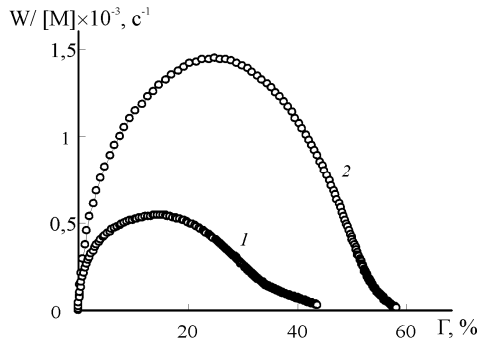
-3

k_H PQ ,

-4

-8,

).



. 3. :) (1), -2 (2);)
 -3 (1), -4 (2), -8 (3) $[PQ]=1.1 \times 10^{-2}$ / , I=40

-4

-8

-3

-3 n=3

n=4 8

,

“

”

(

),

,

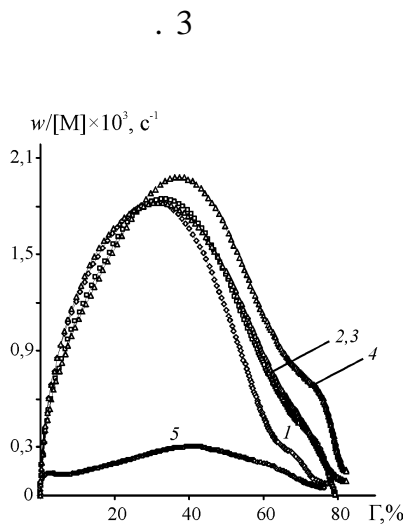
,

;

,

.

2. 3.



. 3. (1) 10
 -3 .% C₆H₁₂ (2), C₆H₆ (3), C₆H₅Cl (4)
 (5)

10 .% C₆H₆ (ε=2.28), C₆H₅Cl
 (ε=5.62) C₆H₁₂ (ε=1.89),
 -3 .
 C₆H₆
 C₆H₅Cl 30 .%
 w/[M]=f()
 w/[M]=const. 10
 .% (ε=37.7)

8.6 ^{2/} 7.5 ^{2/} ,
 PQ (6 k_H=1.36×10^{-2 -1} k_H=0.23×10^{-2 -1}) ,

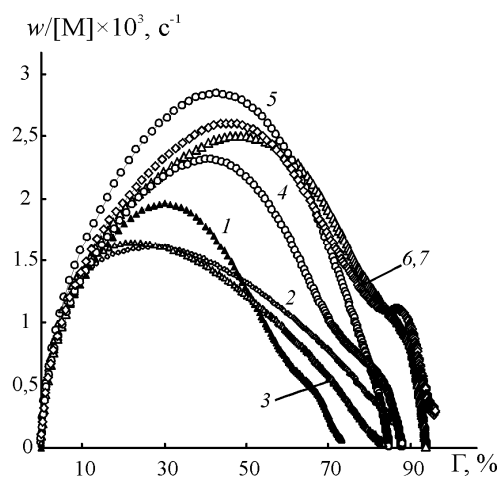
2. 4.

(morth) (im), (N), (pyr), (pyrrol), (P),
 -3 -8, . .

2. 4. 1.

$w/[M]_{(\dots)}$ -3, 10 .%, 30 .%, . 4 -3

Kat[⊕] (CF₃SO₂)₂N[⊖], Kat[⊕] -



. 4.

-3 (I)

- Kat[⊕] (CF₃SO₂)₂N[⊖],
 Kat[⊕]: 2) [N(C₆H₁₃)₃(C₁₄H₂)[⊕] ;
 3) [P(C₆H₁₃)₃(C₁₄H₂₉)[⊕] ; 4) [N-CH₃-N-
 C₂H₅pyrrol][⊕] ; 5) [N-CH₃-N-
 C₂H₅morth][⊕] ; 6) [N-C₂H₅pyr][⊕] ;
 7) [1-CH₃-3-C₂H₅im][⊕] . [] = 30 .%

R₁=CH₃ 2 6
 $w/[M]_{(\dots)}$ 6 14
 ([1-CH₃-3-C₆H₁₃im][⊕] [1-CH₃-3-
 C₁₄H₂₉im][⊕]) -

[1-CH₃-3-C₄H₁₃im][⊕]
 [1,3-(C₄H₉)₂im]

-3, [1-CH₃-3-isoC₄H₉im][⊕],

$w/[M]_{(\dots)}$ -3 100%

[1-CH₃-3-C₄H₉im][⊕] X[⊖],
 X[⊖] = CF₃COO[⊖], (CF₃SO₂)₂N[⊖], PF₆[⊖], CF₃SO₃[⊖], (CF₃CF₂)₃PF₃[⊖], BF₄[⊖].
 [1-CH₃-3-C₄H₉im][⊕] BF₄[⊖], $w/[M]_{(\dots)}$

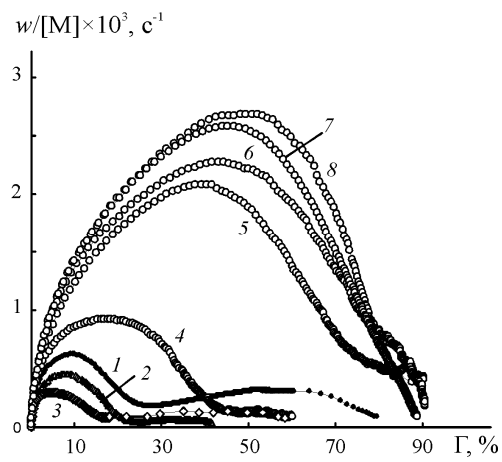
$w/[M]_{(\dots)}$ -3



-3. , ,
 (10 .%),
 -3 , , -3
 30%.

2. 4. 2.

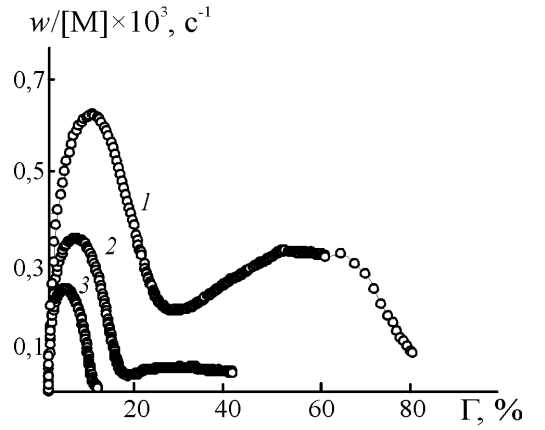
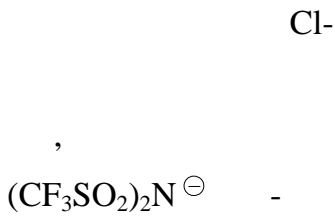
. 5 -8
 $[\text{P}(\text{C}_6\text{H}_9)_3(\text{C}_{14}\text{H}_{29})]^{\oplus} .$
 $(\text{CN})_2\text{N}^{\ominus} \quad (\text{CF}_3\text{SO}_2)_2\text{N}^{\ominus} ,$
 -8, , ,



$\text{CF}_3\text{SO}_3^{\ominus} , (\text{CF}_3\text{CF}_2)\text{PF}_3^{\ominus} \quad \text{Cl}^{\ominus} .$
 , 2 .%.
 $[\text{P}(\text{C}_6\text{H}_9)_3(\text{C}_{14}\text{H}_{29})]^{\oplus} \text{Cl}^{\ominus}$

. 5. $(\text{CN})_2\text{N}^{\ominus}$
 $[\text{P}(\text{C}_6\text{H}_9)_3(\text{C}_{14}\text{H}_{29})]^{\oplus} \text{X}^{\ominus} \quad (\text{CF}_3\text{SO}_2)_2\text{N}^{\ominus}$
 -8: -8,
 (1) -8 ; (2) $\text{X}=(\text{CN})_2\text{N}^{\ominus} ;$
 (3) $\text{X}=(\text{CF}_3\text{SO}_2)_2\text{N}^{\ominus} ;$ (4) $\text{X}=\text{PF}_6^{\ominus} ;$ (5)
 $\text{X}=\text{Br}^{\ominus} ;$ (6) $\text{X}=(\text{CF}_3\text{CF}_2)_2\text{PF}_6^{\ominus} ;$ (7)
 $\text{X}=\text{Cl}^{\ominus} ;$ (8) $\text{X}=\text{CF}_3\text{SO}_3^{\ominus} . [\quad] = 10$
 .%

(. 6). , 3
 -8 2 .

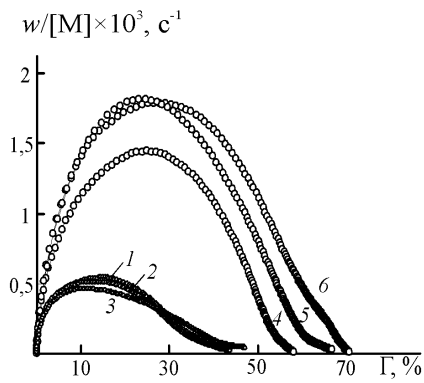


6.
 (1)
 -1: (2) 10 .%; (3) 20 .%

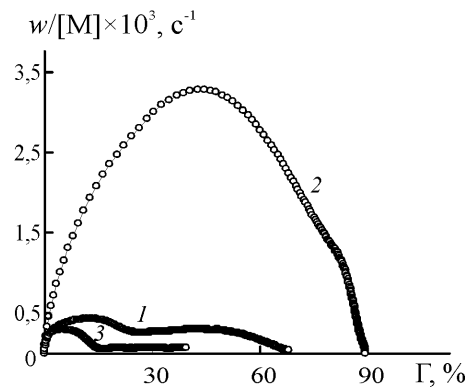
2. 4. 3.

n=1, 2 4

-1 -2 ()
 -1 -2



7.
 (1) (2) (1-3 4-6,
): (1 4), (I)
 -1 (2 5) -2 (3 6). 2 (3). [-1]=10 .%, [-2]=2 %



8.
 (4)
 (I) -1 (2) -
 [-1]=10 .%, [-2]=2 %

[]=10 .%

. 7 ,

-1 -2 -

15

-2.

-4

-8:

(. 8).

2

,
:

n=1, 2, 3 ,

n=4 8.

-

2 .%

()

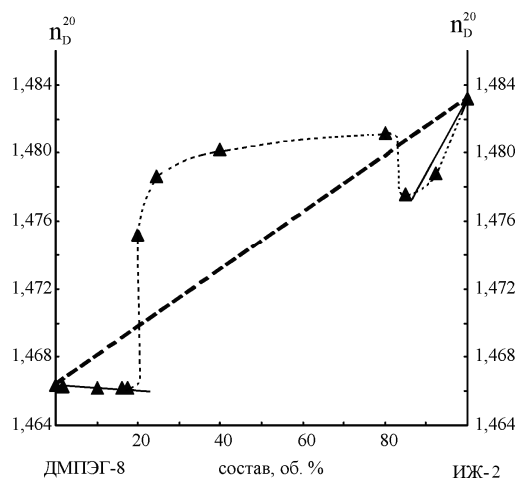
-1

n = 4, 8

-2

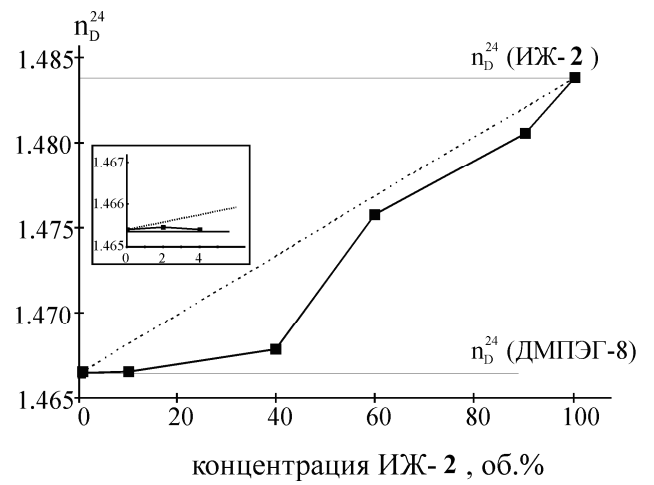
2. 5.

(n_D)
-2
-8 - -2



9. n_D ()

,
-1 -2 -1.
 n_D - -2 -3 -
-2.



10. n_D ()

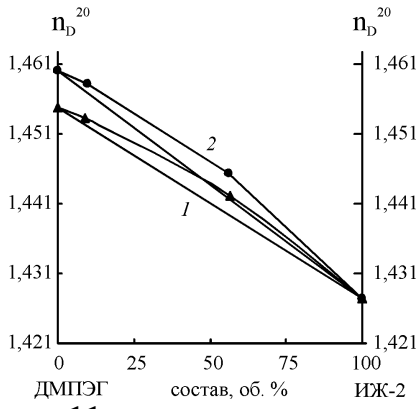
-2
-1. ()

,
 n_D -8 -
-2 10 .% n_D ,
(. 10).

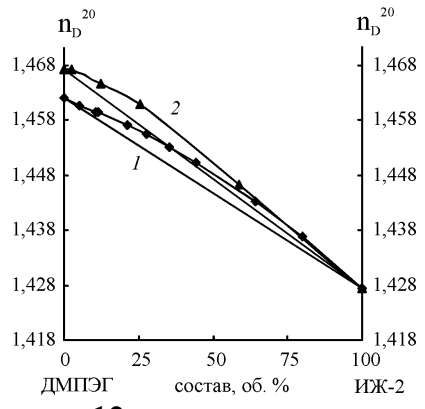
. 11 12
 $n=1, 3, 4, 8$
(n) - -1
-2,

,
 n_D -8 -
-1. n_D
.

n_D -



11.



12.

$T=20\text{ }^\circ\text{C}$: 1) - ; 2) -

8

-3.

-8

-2

$n=4$

-8

.%

20

()

-2 2 .%

-8 -1

(10 .%

)

(-4 -8).

(n=1-3)

2. 6.

()

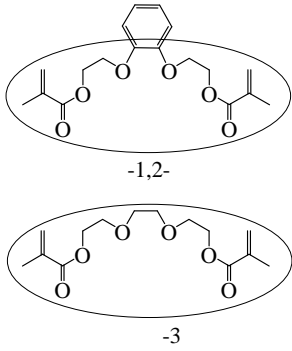
T

() , () 2,2- (-4-) -
 - (()), 2,2'-(1,4- - -()) (()-1,4-),
 () () 2,2'-(1,2-
 - -()) (-1,2-). -1,2-
 -3.

-1,2- - -

, -3 - - 2- 2-,
-3

(1).



1

= -

3.96 Å.

~ 4 Å

C=C

4.599

12.291 Å,

4 Å.

()

3 ()

()

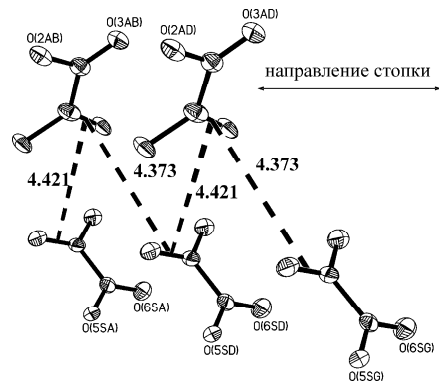
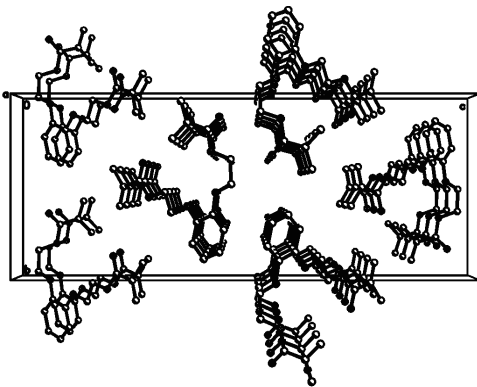
. 13

()

-1,2-

4.599 Å,

- 4.373 4.421 Å.



. 13, .
-1,2-

. 13, .

-1,2-

()

2.

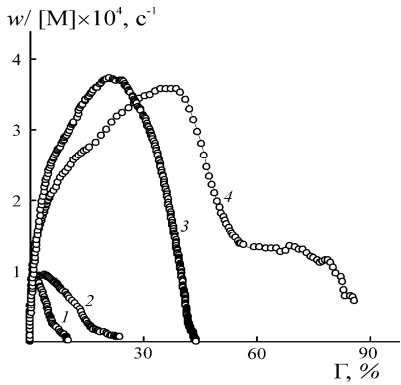
CH₃-

CH₂-

1 Å. $\frac{20}{2}$,
 ,
 4 Å, - -
 (3.4 Å).

4.269 Å 4.621 Å .

(. 14).



. 14.

(1); (2), (3)
 (4) =95

$$w/[M]_{()} = 0.6 \times 10^{-4} \text{ }^{-1}$$

$$w/[M]_{()} = 0.5 \times 10^{-4} \text{ }^{-1}$$

35 30%

=92 ; =25 =40 ()

()

-1,4- , -1,4- -1,2-

()

-1,4- ,

3.996 Å. -1,4-

-1,4- , -1,4- -1,2-

()

-1,4-

-1,4-

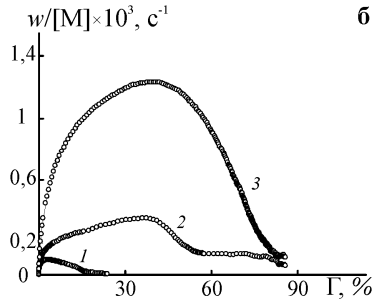
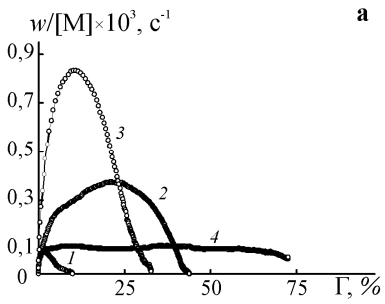
=2%

$w/[M]$

80%.

-1,4- 7 10 , -1,4- -1,2- ,

(. 15).



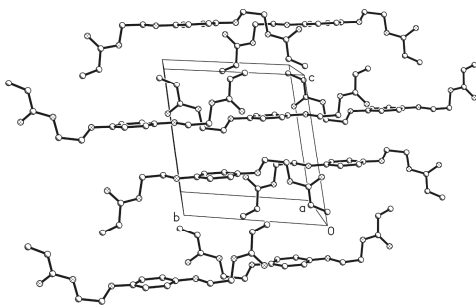
. 15. (1), (2), -1,4- (3), -1,4- (4) () -1,2- -1,4- 4

(1), (2), -1,2- (3) () -1,4- , -1,4- 8

(77, 70 47° -1,4- , 1 2 () 3

-1,2-) , 3

4 () -

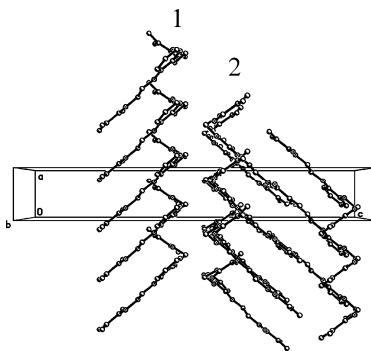


. 16.

-1,4-

-1,4-

“ ”



. 17.

-1,4-

2-

20

1

,

,

”

. -1,4- , ,
 ,
 (. 16). , -1,4-
 ,
 -1,4- - -
 , ,
 “ ”
 , -1,4- , -1,2-
 “ ”
 -1,2- (. 17).

2.

C=C

()

-1,2-

	d , Å	d , Å
	12.291	4.365 3.739
	6.393	3.621 4.865
	9.729 10.068	5.170 5.303 4.012
	8.279	4.208 5.920
-1,4-	11.343	4.867 3.996 4.265 4.139
-1,4-	7.325	4.568 4.215 4.634
-1,2-	4.599	4.373 4.421
	5.473	5.268 4.269
	6.798	4.621 4.104

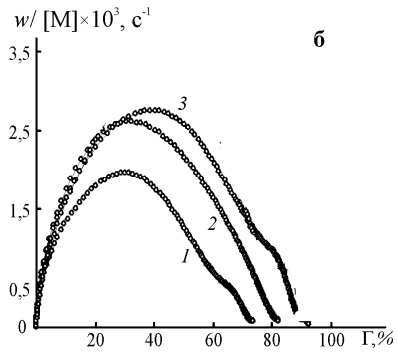
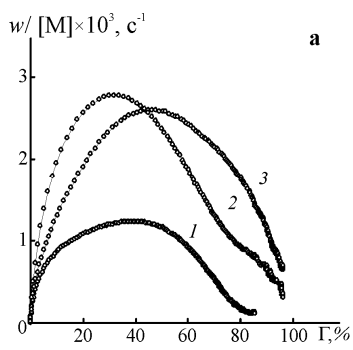
-1,4-

-1,4-

()

()

18 “ ”
 -1,2-
 -3 (. 18)
 -3 -8
 -1 -2.
 -3
 -1 -2
 $w/[M](c .)$ $2.6-2.8 \times 10^{-3} c^{-1}$;
 : 80-90% -3 100% -1,2-



18. 10 . % -2 (2) -1,2- () -3 () = 47 ° . -3
 , = 22° -1 (3); -1,2- : , = 47 ° . -3

-3

-1,2-

-3.

1.

2.

()

3.

()

“ ”

3.621

12.291 Å. ,

()

“ ” “ ”.

4.

5.

“ ” . , ,

(. . .)

. . .

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2.

2,2- (-4-)

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 21- ”. - .2007. .304.

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