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Heterocycles derivatives

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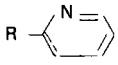
HETEROCYCLES DERIVATIVES

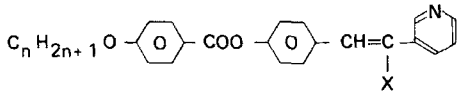
- **2–substituted pyridins**



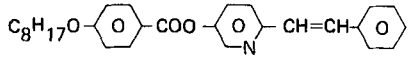
R	K_2	K_1	S_3	S_B (1)	S_A (1)	N (1)	I	Ref.
CH_3O–Ph–COO–Ph–CH=CH–	–	• 151 *6.11*	–	–	–	• 179 *0.07*	•	5
$C_8H_{17}O$–Ph–COO–Ph–CH=CH–	• 92 *4.40*	• 112 *2.34*	–	–	–	• 153 *0.14*	•	5
CH_3O–Ph–Ph–N=CH–	–	• 116.8 *4.89*	–	–	–	• 118.8 *0.47*	•	36, 1, 83
$C_8H_{17}O$–Ph–Ph–N=CH–	–	• 82 *3.10*	• 112.5 *0.33*	• 116 *1.34*	• 119.5	• 123.5 *0.16*	•	5

(1) S_B, S_A, N : from textures.

• **3–substituted pyridins**

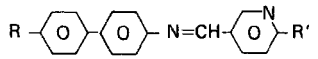


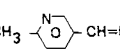
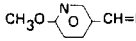
n	X	K_2		K_1		N		I	Ref.
1	–CN	•	154 *4.59*	•	162 *3.03*	•	194 *0.07*	•	5
8	–H	–		•	54 *7.61*	•	65 *0.06*	•	5
8	–CN	–		•	112 *11.66*	•	159 *0.09*	•	5



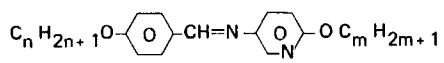
K_2 49 *3.06* K_1 62 *9.96* S_A (1) 64 *2.18* I Ref. 5

(1) From texture.



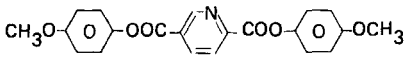
R	R′	K_2	K_1	S_3	S_B (1)	S_A (1)	N	I	Ref.
CH_3O	H	–	• 175.7 *3.70*	–	–	–	• 195.2 *0.095*	•	36, 1, 83
$C_8H_{17}O$	H	–	• 107 *6.21*	• 164 *0.66*	• 175 *0.39*	• 194 *2.48*	–	•	5
	H	• 144 *1.31*	• 244 *3.86*	–	–	–	• 324 *0.09*	•	5
	$-CH_3$	• 179	• 215 *4.90*	–	–	–	• 258 *0.14*	•	5
	$-OCH_3$	• 166 *1.11*	• 190 *8.14*	–	–	–	• 267 *0.18*	•	5

(1) From texture.



n	m	K		S_B		S_A		N		I	Ref.
1	1	•	94 *7.73*	–		–		–		•	86
4		•	70.6 *6.97*	–		•	75.0 *2.23*	–		•	86
6		•	65.0 *5.76*	•	68.0 *0.68*	•	78.0 *1.64*	–		•	86
7		•	62.8 *6.98*	•	69.0 *0.59*	•	81 *1.85*	–		•	86
2	2	•	84.0 *7.75*	–		–		•	87.0	•	86
3		•	89.5 *9.37*	–		–		–		•	86
4		•	81.7 *5.94*	•	86 *1.08*	•	91.5 *1.91*	–		•	86
5		•	62.8 *7.27*	•	84.0 *1.28*	•	91.0 *2.0*	–		•	86
6		•	83.0 *7.13*	•	85 *1.35*	•	97.0 *2.11*	–		•	86
7		•	70.8 *8.56*	•		•	97.0 *1.94*	–		•	86
1	3	•	55.6 *7.44*	–		–		•	[18.0]	•	86
2		•	67.0 *5.93*	–		•	[61]	•	71	•	86
3		•	80.0 *6.85*	–		–		•	[75.0]	•	86
4		•	75.2 *3.18*	•	90.5 *0.99*	•	93.0 *1.65*	–		•	86
5		•	52.5 *3.06*	•	84.5 *1.18*	•	93.0 *1.88*	–		•	86
6		•	51.3 *4.32*	•	86.0 *1.35*	•	96.0 *2.00*	–		•	86
7		•	78.2 *8.71*	•	83.0 *1.68*	•	94.0 *2.08*	–		•	86

n	m	K		S_B		S_A		N		I	Ref.
1	4	•	60.0 *8.63*	–		–		•	[43.0]	•	86
2		•	76.0 *3.85*	–		•	[69]	•	84.0 *0.09*	•	86
3		•	69 *5.85*	•	[65]	•	77	–	*1.92*	•	86
4		•	62.0 *6.37*	•	82.0 *0.99*	•	96.0 *1.76*	–		•	86
5		•	55.8 *5.61*	•	79.0 *1.11*	•	93.0 *1.65*	–		•	86
6		•	66.7 *6.20*	•	84.0 *1.24*	•	99.0 *1.96*	–		•	86
7		•	72.5 *6.54*	•	83.0 *1.35*	•	98.0 *1.76*	–		•	86
1	5	•	51.0 *7.09*	–		–		•	[35.5]	•	86
2		•	60.0 *6.33*	–		•	67.0 *0.23*	•	78.5 *0.16*	•	86
4		•	60.5 *7.35*	•	81.0 *0.84*	•	94.0 *1.96*	–		•	86
5		•	65.0 *6.32*	•	76.0 *1.19*	•	91.0 *1.69*	–		•	86
6		•	52.4 *4.59*	•	78.0 *1.53*	•	96.0 *2.40*	–		•	86
7		•	62.5 *6.69*	•	79.0 *1.51*	•	95.0 *2.11*	–		•	86
1	6	•	53.0 *9.83*	–		•	[28.0]	•	[42]	•	86
2		•	56.0 *7.43*	•	[48]	•	69.0 *0.09*	•	82.0 *0.23*	•	86
3		•	58.2 *5.56*	•	64.0 *1.02*	•	78.0 *1.31*	–		•	86
4		•	47.7 *5.89*	•	77.0 *0.92*	•	95.0 *1.87*	–		•	86
5		•	57.2 *5.60*	•	72.5 *0.93*	•	91.0 *1.90*	–		•	86
6		•	57.0 *5.34*	•	77.0 *0.99*	•	97.0 *1.99*	–		•	86
7		•	69.2 *5.22*	•	75.0 *0.94*	•	96.0 *1.78*	–		•	86



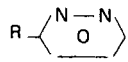
K 173.2 N 255.3 I Ref. 21
0.311

• Pyridines substituées en 4

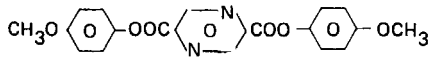
R	K_2	K_1	S_3	S_B (1)	S_A (1)	N (1)	I	Ref.
CH_3O–Ph–Ph–N=CH–	–	• 193.8 *8.65*	–	–	–	• [181.3] *0.084*	•	83, 1
$C_8H_{17}O$–Ph–Ph–N=CH–	–	• 108 *6.67*	• 173 *0.48*	• 182 *0.56*	• 187.5 *2.28*	–	•	
CH_3O–Ph–COO–Ph–CH=CH–	• 65 *4.31*	• 140 *5.63*	–	–	–	• 230 *0.28*	•	5
$C_8H_{17}O$–Ph–COO–Ph–CH=CH–	• 95 *4.58*	• 117 *0.32*	–	–	–	• 214 *0.25*	•	5

(1) From texture.

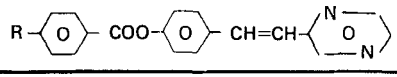
• **Pyrimidine**



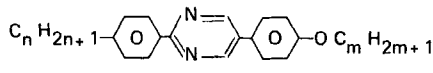
R	K	N	I	Ref.
CH_3O–Ph–COO–Ph–CH=CH–	• 189 *8.80*	• 238 *0.02*	•	5
$C_8H_{17}O$–Ph–COO–Ph–CH=CH–	• 139 *8.41*	• 210 *0.21*	•	5



K 202.6 N 249.5 I Ref. 21
0.316



R	K	N	I	Ref.
CH_3	• 192 *8.39*	• 213 *0.09*	•	5
$C_8H_{17}O$	• 132 *9.05*	• 172 *0.16*	•	5



n	m	K	S_G	S_F	S_C	S_A	N	I	Ref. (1)
1	1	• 179 183–184 *5.3*	–	–	–	–	• 214–219 210–211 *0.22*	•	169
2	2	• 146 *4.8*	–	–	–	–	• 226.5 *0.24*	•	169
3	3	• 132.2 *4.5*	• [124.2] *0.05*	–	–	• 205 *0.53*	• 216.5 *0.24*	•	169
3	5	• 104.5 104.4 *4.1*	• 130.3 130.4 *0.79*	–	• 145.3 145.1 (a)	• 216 215.5 *1.7*	–	•	169
4	4	(b) • 90.3 *4.1*	• 113.7 *0.60*	•	• 120.7 120.6 *0.16*	• 215 *1.7*	–	•	169
4	5	• 81 81.9 *4.5*	• 123.8 124 *0.31*	–	• 153 153.5 *0.10*	• 212 211 *1.2*	–	•	169
5	5 (2)	(b) • 79.5 79.4 *5.7*	• 102.4 102.4 *0.06*	• 113.2 113 *0.17*	• 144.8 144.5 *0.04*	• 210.2 211 *1.7*	–	•	169
5	6	• 65 65.1 *5.7*	• 98.8 99.1 *0.06*	• 116.5 117 *0.17*	• 153.5 153.8 *0.03*	• 211 210.6 *2.0*	–	•	169
6	5	• 79.2 80.5 *7.4*	• 80.3 80 *0.014*	• 107.9 109 *0.14*	• 136.8 136 *0.03*	• 207 207.7 *1.9*	–	•	169
6	6	• 76.5 77 *6.7*	• 80.0 80 *0.012*	• 116.5 116 *0.18*	• 153.2 152 *0.04*	• 206 206 *2.0*	–	•	169
7	5	• 79.5 80.1 *7.2*	• [62] [62.5] *0.005*	• 102.9 104.2 *0.11*	• 125.8 125.7 (a)	• 205 206.4 *2.0*	–	•	169
7	7	• 80.5 81 *7.9*	• 84.5 84 *0.004*	• 124.7 124 *0.22*	• 171.8 171 *0.07*	• 200 200 *2.1*	–	•	169
8	5	• 73 73.6 *8.6*	–	• 101.7 102 *0.22*	• 114.2 112.8 (a)	• 203 203.8 *2.2*	–	•	169

n	m	K	S_G	S_F	S_C	S_A	N	I	Ref. (1)
8	6	• 77 78.4 *9.1*	–	• 114.8 114.9 *0.23*	• 135 134.2 (a)	• 202 203.4 *2.2*	–	•	169
8	8	• 76.5 76–77 *9.1*	• 88–89 88.3–89.3 *0.001*	• 129 130.2 *0.55*	• 177 176.7 *0.13*	• 195.2 194.9 *2.4*	–	•	169
9	5	• 74.3 74.7 *8.4*	–	• 98 97.5 *0.22*	• 107.7 107.5 (a)	• 200.5 200.5 *2.2*	–	•	169
9	9	• 88.5 88.9 *12*	• 92–93 (c) (c)	• 130.6 131 *0.62*	• 180.2 180.1 *0.17*	• 189 189.2 *2.4*	–	•	169
10	5	• 75.2 75.6 *9.6*	–	• 96 96.1 (d)	• 98 97.4 (d)	• 197.9 198.6 *2.3*	–	•	169
10	10	• 86 87.3 *12.4*	• 117.7 117.7 *< 0.001*	• 132.8 132.6 *0.84*	• 179.4 179.6 *0.19*	• 183.5 183.8 *2.6*	–	•	169

(1) For each compound :
First line : transition temperatures according to the microscopic observation.
Second line : transition temperatures from the DSC investigations.

(a) : S_C/S_A transition without latent heat only a jump in the C_p curve.

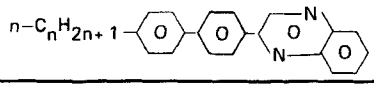
(b) ⇔k : With decreasing temperature transition in n, m = 4.4 at 73°C and n, m = 5.5 at 61.5°C to an additional smectic phase, classified as smectic H by L. Richter, H. Sackmann et al (to be published).

(c) ⇔ e : S_G–S_F transition : only observed by microscopy.

(d) ⇔ f : The transitions S_F–S_C and S_C–S_A showed a double peak which could not be split into two parts.

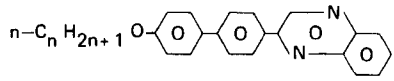
(2) See ref. 87.

• **Quinoxalins**



n	K		S_E (1)		S_A (1)		I	Ref.
1	•	122 *8.03*	–		•	152 *0.074*	•	88
2	•	122 *3.22*	–		•	165 *1.32*	•	88
3	•	121 *2.73*	–		•	175 *1.32*	•	88
4	•	120 *5.90*	–		•	167 *1.02*	•	88
5	•	112 *2.37*	–		•	171 *1.22*	•	88
6	•	99 *2.02*	–		•	173 *1.14*	•	88
7	•	86 *2.43*	•	88 *0.87*	•	170 *0.98*	•	88
8	•	60 *5.48*	•	82 *0.76*	•	176 *0.33*	•	88
10	•	53 *5.26*	•	83 *0.88*	•	171 *1.79*	•	88

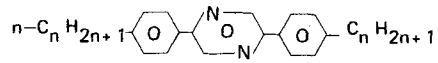
(1) Identified by isormorphy Ref. 88.



n	K		S_E (1)		S_A (1)		N		I	Ref.
1	•	169 *6.8*	–		•	[163] *0.75*	•	203 *0.09*	•	88
2	•	175 *1.69*	–		•	202 *1.39*	•	216 *0.13*	•	88
3	•	157 *3.02*	–		•	204 *1.83*	–		•	88
5	•	145 *4.89*	•	[130] 1.09	•	206 1.79	–		•	88
8	•	96 *2.10*	•	115 *1.07*	•	195 *1.64*	–		•	88
10	•	98 *2.44*	•	119 *1.34*	•	191 *2.18*	–		•	88

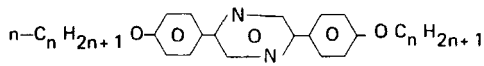
(1) Identified by isomorphy.

• **Pyrazines**



n	K		S_C (1)		S_A (1)		N		I	Ref.
2	•	163.8 *6.22*	–		–		•	176.2 *0.08*	•	76
3	•	157.3 *4.88*	–		–		•	200.7 *0.26*	•	76
4	•	161.3 *5.35*	•	166.4 *0.85*	–		•	181.9 *0.23*	•	76
5	•	134.3 *4.29*	•	173.6 *0.08*	•	182.2 *0.29*	•	191.3 *0.36*	•	76
6	•	116.1 *3.97*	•	172.3 *0.09*	•	179.2 *1.17*	–		•	76
7	•	109.6 *4.34*	•	175.0 *0.08*	•	187.0 *1.76*	–		•	76
8	•	104.6 *3.46*	•	178.0 *2.38*	•	187.0 *1.79*	–		•	76
9	•	108.8 *4.85*	•	177.0 *2.38*	–		–		•	76
10	•	111.2 *6.88*	•	171.5 *2.14*	–		–		•	76

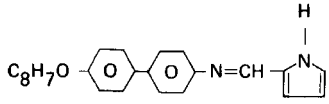
(1) Identified by isomorphy Ref. 76 ter.



n	K_2		K_1		S_B (1)		S_C (1)		N		I	Ref.
1	–		•	228 *9.40*	–		–		•	274 *0.32*	•	76
2	–		•	221 *8.65*	–		–		•	280 *0.42*	•	76
3	•	155	•	202 *8.49*	–		–		•	242 *0.45*	•	76
4	•	155 *1.41*	•	170.3 *2.69*	–		•	218 *0.96*	•	246 *0.38*	•	76
5	•	56	•	153.4 *4.66*	–		•	211 *1.18*	•	224 *0.39*	•	76
6	•	130 *0.75*	•	135.7 *1.83*	•	139.6 *2.38*	•	212 *1.21*	•	220 *0.58*	•	76
7	–		•	126 *3.62*	•	128.5 *1.41*	•	211 *1.57*	•	212 *0.59*	•	76
8	–		•	118.8 *3.17*	•	121.1 *1.37*	•	209 *2.93*	–		•	76
9	–		•	118.7 *12.26*	–		•	204 *2.78*	–		•	76
10	•	75	•	113.0 *11.81*	–		•	201 *3.47*	–		•	76

(1) Identified by isomorphy Ref. 76 quater.

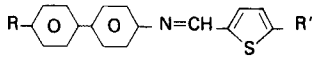
• **Pyrrole**



K_2 94 *1.92* K_1 119 *3.65* S_A (2) 189 *3.69* I Ref. 5

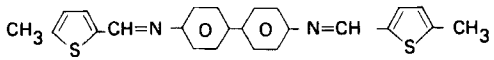
(1) From texture Ref. 5.

• **Thiophenes**

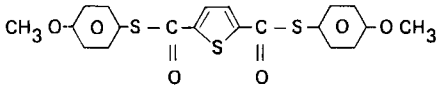


R	R'	K	S_3	S_B (1)	S_A (1)	N	I	Ref.
CH_3O-	CH_3-	• 160.1 *7.51*	–	–	–	• 211.0 *0.153*	•	1, 83, 5
$C_8H_{17}O-$	H	• 132 *2.68*	• 152 *0.09*	• 157	– 157 *3.95*	–	•	5
$C_8H_{17}O-$	CH_3-	• 150 *2.96*	–	–	–	• 181 *0.13*	•	5

(1) Identified from textures.

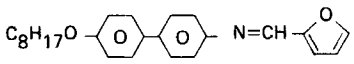


K_2 179 *1.10* K_1 214 *5.01* N 280 I



K 136.1 N 213.6 *0.292* I Ref. 199

• **Furane**



K_2 49 *1.39* K_1 137 *3.30* N [132] I Ref. 5