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Novel Chiral Dopants from Optically Active 2,4-Pentanediol

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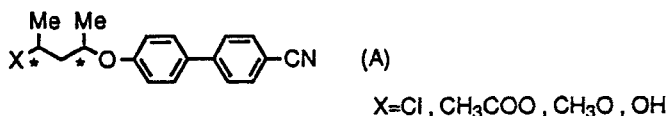
and

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A variety of chiral dopants from optically active 2,4-pentanediol (A) were prepared.



The temperature coefficient of induced cholesteric pitch of these materials (dP/dT) was measured to show that dP/dT depended on substituent group X. When $X = \text{Cl}$, compound (A) shows a short induced helical pitch and $dP/dT = 0$. Acetoxy and methoxy derivatives show negative dP/dT . Furthermore, when $X = \text{OH}$, compound (A) shows positive dP/dT .

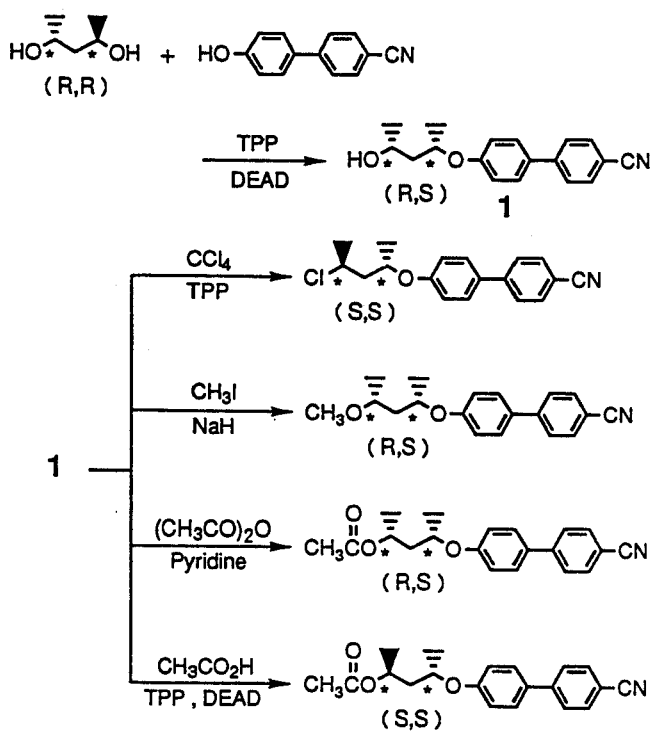
Keywords: *chiral dopant, optically active 2,4-pentanediol, helical pitch*

INTRODUCTION

It is well known that the temperature coefficient of an induced cholesteric pitch can be controlled by the blending of chiral dopants having right handed and left handed twist,¹ but it is difficult to obtain a LC mixture having a short induced helical pitch.

The temperature coefficient is also controlled by adding a chiral dopant having negative or positive dP/dT with the same twist.² We have prepared some chiral dopant (A) from optically active 2,4-pentanediol, and investigated dP/dT of these compounds (A). We report the relationship between dP/dT and the chemical structures of these compounds (A) (Scheme I).

As shown in Tables I and II, the relationship between the temperature coefficient



Scheme I

TABLE I

Chemical structures of chiral dopant

No	Chemical Structures
1	
2	
3	
4	
5	
6	

TABLE II
Induced cholesteric pitch and configuration

No	X	Y	P ₃₀	P ₆₀ /P ₃₀
1	R.S	R	17.4	1.11
2	S.S	R	7.4	1.00
3	R.R	L	7.8	1.02
4	R.S	R	26.0	0.90
5	R.S	R	36.0	0.98
6	S.S	R	30.2	0.75
S-811	S	L	11.4	1.04

X: Absolute configuration. Y: Twist sense.

and substituent groups of compound (A) are as follows: OH > 0, Cl = 0, CH₃ and CH₃COO— < 0. Moreover the relationship between induced cholesteric pitch and substituent groups of compound (A) are: CH₃COO— > CH₃— > HO— > Cl.

It can, therefore be said that selection of substituent groups of compound (A) determines what the temperature coefficient and induced cholesteric pitch will be.

References

1. Jpn. Kokai 80-38869.
2. N. Emoto, *et al.* 288. Japan Display '86.