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THERMOTROPIC P,P'-DISUBSTITUTED PHENYL BENZAMIDE

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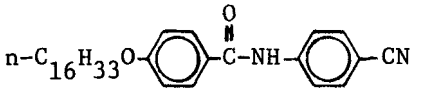
A numerous number of aromatic thermotropic liquid crystals have been reported in the literature, and also reviewed by Brown and others[1]. These liquid crystals are generally composed of two or more p-substituted aromatic rings which are connected by a central group such as CO_2, multiple bonds (C=C, C≡C, C=N, N=N, etc.), or hydrogen bonding of dimeric acid. A class of nematic liquid crystalline p,p'-disubstituted phenyl thiolbenzoates[2] has recently been disclosed.

We now wish to report microscopic observations relating to the thermotropic behavior of 4-n-cetyloxy-N-4'-cyanophenyl benzamide (1) and bis(p-cyanophenyl) terephthalamide (2).



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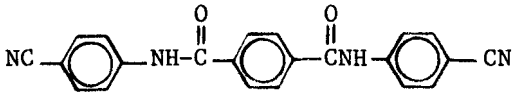

2

These compounds are the first examples of thermotropic p,p'-disubstituted benzanilides in which two or three aromatic rings are connected by only amide central group(s). The substituted benzanilide 1 and the compound 2 were prepared by the reaction of 4-cyanoaniline with p-n-cetyloxybenzoyl chloride or terephthoyl dichloride, respectively, in N-methylpyrolidone-2 and then further purified by liquid chromatography on silica gel using a mixture of methylene chloride (98%) and n-hexane (2%) as the eluent.

The materials were characterized by standard differential scanning calorimetry and hot stage polarized microcopy techniques. The transitions observed for the two compounds are as follows:

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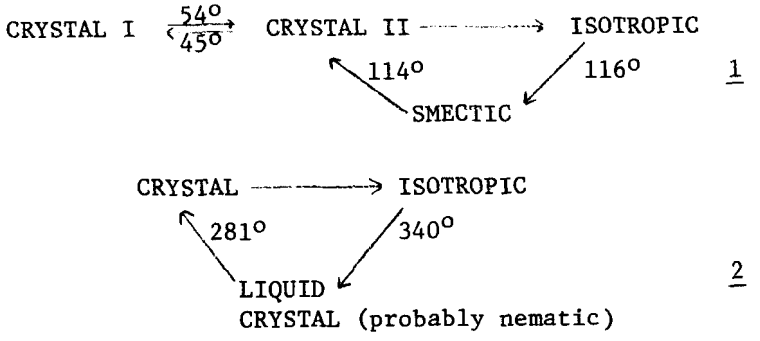
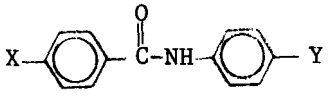


The smectic batonnets observed for compound 1 are shown in Figure 1.

Although 4-n-pentyloxy-4'-cyanophenyl benzoate[3] exhibited a monotropic transition at 76.5°, its amide analog 3 failed



3 X = n-$C_5H_{11}O$, Y = CN

to produce an anisotropic liquid.

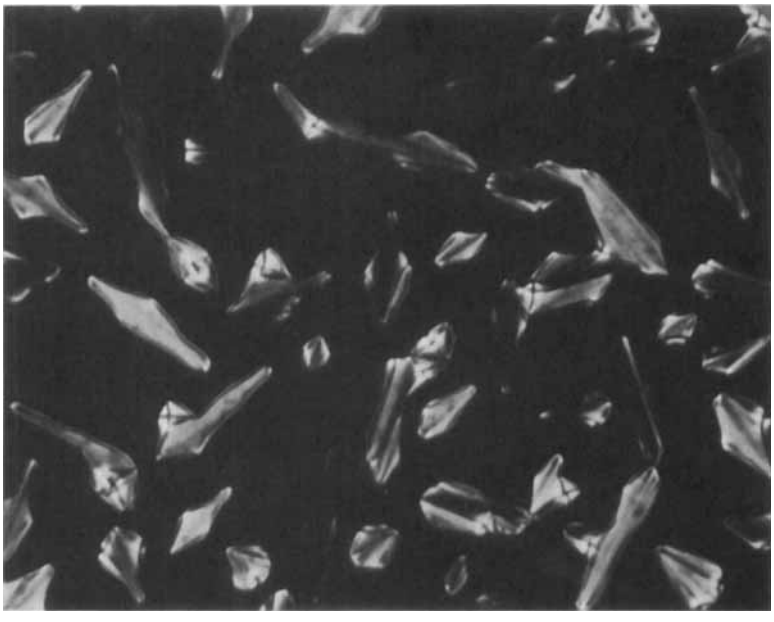


FIGURE 1. Smectic Bâtonnets of 4-n-cetyloxy-N-4'-cyano-phenyl benzamide (1) between crossed polars.

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2. (a) Reese M. Raynolds, Craig Maze and Everett Oppenheim, Abstract of the Sixth International Liquid Crystal Conference, Kent, Ohio, August, 1976.

3. D. Coates and G. W. Gray, ibid.