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Thermotropic P, P'-Disubstituted Phenyl Benzamide

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THERMOTROPIC P,P'-DISUBSTITUTED PHENYL BENZAMIDE

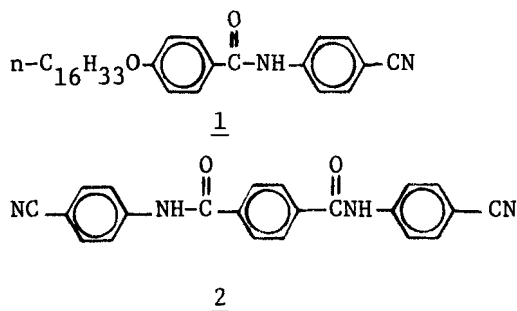
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(Submitted for publication November 29, 1978)

A numerous number of aromatic thermotropic liquid crystals have been reported in the literature, and also reviewed by Brown and others¹. These liquid crystals are generally composed of two or more *p*-substituted aromatic rings which are connected by a central group such as CO₂, 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 thiolbenzoates² has recently been disclosed.

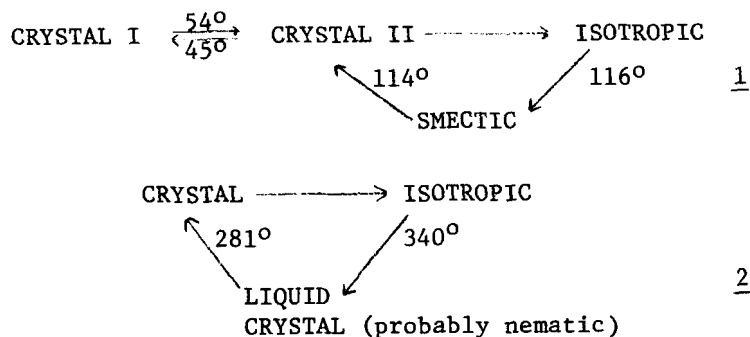
We now wish to report microscopic observations relating to the thermotropic behavior of 4-*n*-cetyloxy-*N*-4'-cyanophenyl benzamide (1) and bis(*p*-cyanophenyl) terephthalamide (2).



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*-methylpyrrolidone-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.

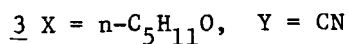
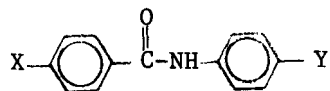
The materials were characterized by standard differential scanning calorimetry and hot stage polarized microcopy techniques. The transitions observed for the two compounds are as follows:

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

Although 4-n-pentyloxy-4'-cyanophenyl benzoate³ exhibited a monotropic transition at 76.5°, its amide analog 3 failed



to produce an anisotropic liquid.

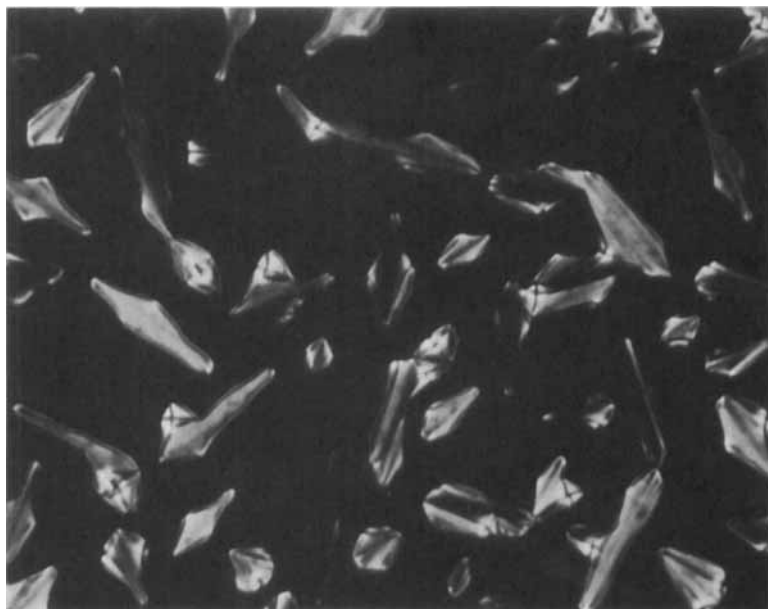


FIGURE 1. Smectic Batonnets of 4-n-cetyloxy-N-4'-cyano-phenyl benzamide (1) between crossed polars.

REFERENCES

1. Glen H. Brown and Wilfrid G. Shaw, Chem Rev. 57, 1049 (1957).
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.