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RECOMMENDATION FOR THE USE OF THE CODE LETTERS G AND H FOR SMECTIC PHASES

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Abstract: As a result of the confused situation that has arisen over the years with regard to the nomenclature of smectic G and H phases, the above authors felt that it would be useful to publish the following letter recommending how these phases should be donominated in the future.

In the course of investigations on smectic polymorphism and of the coding of smectic phases by letters, an inverse denomination of the phases G and H came into use. Examples of this inverse use are deomonstrated by the substances:

2-[4'-n-Pentylphenyl]-5-[4"-n-pentyloxyphenyl]pyrimidine (PPOP),
Terephthalylidene-bis-[4-n-butylaniline] (TBBA), and
N-[4-n-butyloxybenzylidene]-4'-ethylaniline (BBEA).

Until now, the phases given by these substances with increasing temperature have been coded according to either (a) or (b)

	PPOP		TBBA		BBEA
(a)	H G F C A	(a)	H G C A N	(a)	G N
(b)	G H F C A	(b)	G H C A N	(b)	H N

Therefore all those phases which may be related to the G and H phases of those substances by uninterrupted miscibility were inversely coded either according to (a) or to (b). This arises because of the transfer of the code letters of phases from one substance to another by the criterion of uninterrupted miscibility; these two inverse codings for all known G and H phases exist in several publications in the literature.

In order to avoid this confusing situation, the authors have agreed to use in future the sequence (a) H G, following historical precedence.

In 1971 the *first* G phase was described for the compound PPOP according to the sequence G F C A.[1] At this time, besides these smectic phases, only smectic phases B, D, and E were known. Later on phases were found which followed the G phase at lower temperatures. This was the case not only for TBBA and several of its homologues, but also for homologues in several other series. These phases were mutually related by uninterrupted miscibility, and the use of a further code letter became necessary; consequently this should be H.

Therefore, for the above substances, only the following code sequence will be used by the authors in the future:

PPOP	H G F C A
TBBA	H G C A N
BBEA	G N

As further examples, the codes of phases in two homologous series are shown in Figures 1 and 2.

If both phases G and H exist in one substance therefore, the G phase is always the higher temperature modification with respect to the H phase.

The authors strongly recommend this agreement for general use in the denomination of smectic phases G and H. They are preparing a list of all known substances possessing G and H phases.

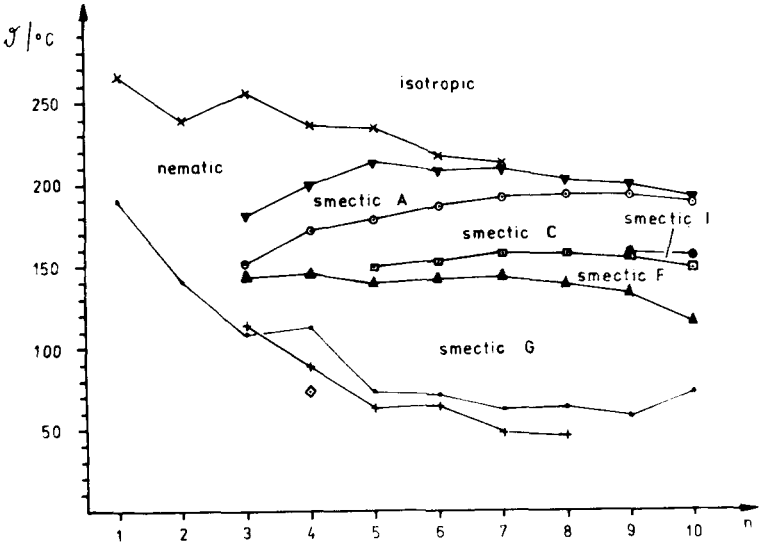

FIGURE 1 Phases and phase transitions for the homologous series of terephthalylidene-bis-[4-n-alkylanilines][2]

n = number of C atoms in the alkyl chains
• = melting point
+ = transition smectic H → smectic G
◇ = transition smectic 5 → smectic H

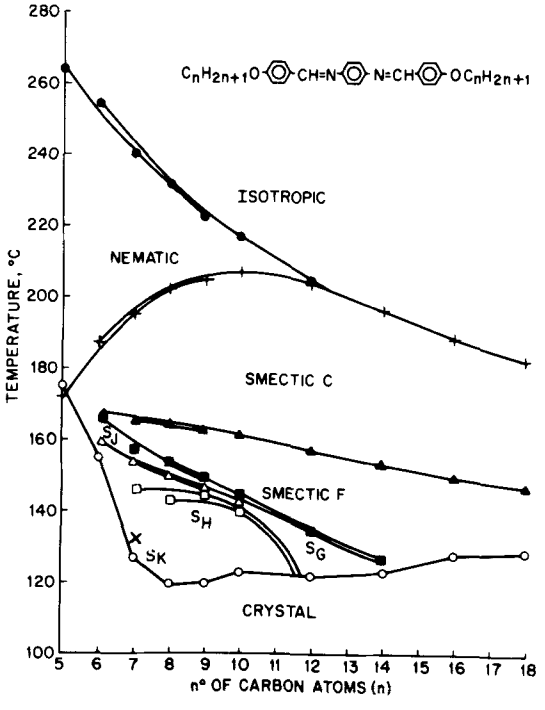

FIGURE 2 Phases and phase transitions for the homologous series of bis-[4'-n-alkoxybenzylidene]-1,4-phenylenediamines[3]

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