In 1996 Niori proved that bent-core molecules can form polar phases. Since then, banana-shaped liquid crystals have become an object of considerable interest. Our research is devoted to design and study of new materials possessing both carbocyclic and heterocyclic central cores, such as benzene, naphthalene as well as thiophene and benzothiophene. The study presented herein is focused on synthesis and application of two isomeric central cores based on diphenyl substituted thiophene, namely 2,5-bis(4-methoxyphenyl)thiophene and 3,4-bis(4-methoxyphenyl)thiophene (Figure 1), for the design of new bent-shaped molecules (Figure 2). The influence of the thiophene orientation, lateral substitution, bend angle, number of aromatic units and length of terminal alkyl chains on mesomorphic behaviour was studied.

The mesomorphic properties were investigated by differential scanning calorimetry and polarized optical microscopy. While the materials based on 2,5-disubstituted thiophene exhibited various nematic and smectic phases, materials derived from 3,4-disubstituted thiophene did not exhibit any mesomorphic properties.

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References:

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