New mesomorphic derivatives of 3-(4-substituted phenyl)-6-allylcyclohex-2-enones, 4-substituted biphenylylvinyl ketones

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It has been reported that different liquid crystalline compounds can be prepared from appropriate 3,6-disubstituted cyclohex-2-enones and 3,5-disubstituted 4,5-dihydroisoxazoles [1,2]. In continuation of these investigations and in an attempt to obtain the promising components of liquid crystalline materials for the display applications we synthesized new 3-(4-substituted phenyl)-6-allylcyclohex-2-enones (I), 4-substituted biphenylylvinyl ketones (II) and examined their possible transformations into 3,5-disubstituted 4,5-dihydroisoxazoles (III, V), 1,2-disubstituted cyclopropanoles (IV) and liquid crystalline compounds with optimized features. The key stages of the cycles formation were 1,3-dipolar cycloaddition of the of allylcyclohex-2-enones (I), vinylketones (II) with corresponding alkyl nitrile oxides or Kulinkovich reaction of allylcyclohex-2-enones (I) with ethyl acetate in the presence of tetraisopropoxytitanium.

It should be noted that different reaction possibilities for the keto groups, the isoxazoline and cyclohexenone fragments allow transformations to be achieved selectively and give the opportunity of preparing liquid crystalline compounds with novel combinations of the structural fragments of LC molecules.

\[
\begin{align*}
\text{I} & \quad \text{II} & \quad \text{III} & \quad \text{IV} & \quad \text{V} \\
\text{H}_{2n+1}C_n & \quad \text{H}_{2n+1}C_n & \quad \text{H}_{2n+1}C_n & \quad \text{H}_{2n+1}C_n & \quad \text{H}_{2n+1}C_n \\
\end{align*}
\]

\[n = 3-7; \ K = \text{benzene or cyclohexane rings}; \ R = \text{CH}_3, \text{CF}_3, \text{C}_3\text{H}_7\]

The investigations of the mesomorphic properties of prepared compounds have shown that they form smectic A and nematic phases at temperature below 100 °C and in a wide temperature range.

Synthesis procedures for all the intermediates and the final products will be discussed.

References

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