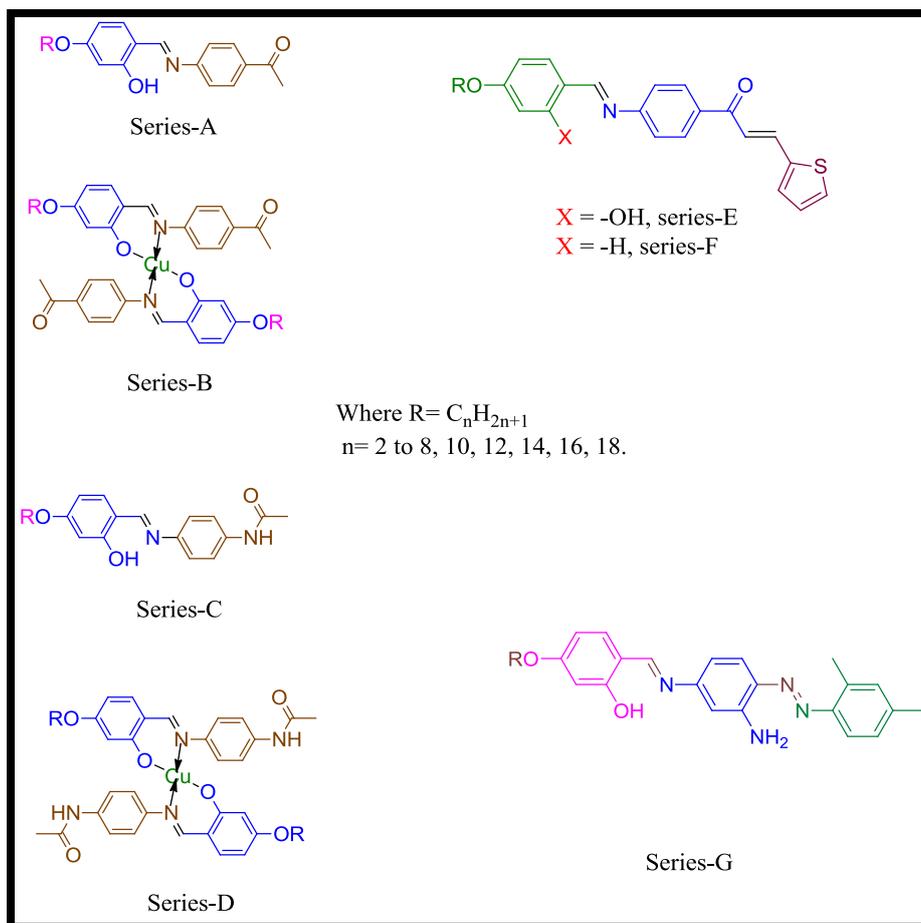


Abstract of the Thesis



In this work, we present the synthesis and liquid crystalline property of the new homologous series of the Schiff base derivatives, and their Cu(II) complexes. All homologous series were synthesized and characterized by FTIR, ¹HNMR, ¹³CNMR, ESI-MS and other analytical methods. The mesophase shown in the series was studied by POM and confirmed by thermograms of DSC.

Chapter-2: In the homologous ligand series, the SmA intermediate phase starts with *n*-propoxy derivatives as monotropic, and then all members of the homologous ligand series show the enantiomeric behavior of SmA. In the Cu(II) metal complex series, the SmA mesophase starts with *n*-pentyloxy derivatives as monotropic, and *n*-hexyloxy derivatives also show monotropic nature. Meanwhile, the enantiotropic SmA mesophase exhibited from

n-heptyloxy to *n*-octadecyloxy derivatives. A chain length of 8 shows the maximum temperature range of the SmA phase, in both series on cooling.

Chapter-3: Both the series exhibited enantiotropic smectic A phase, in the homologues series of ligands and Cu(II) metal complexes mesomorphic property commence from *n*-hexyloxy(-OC₆H₁₃) terminal end group and *n*-octyloxy(-OC₈H₁₇) terminal end group respectively. The clearing temperatures of Cu(II) complexes are higher than the corresponding un co-ordinated ligands due to the presence of metal.

Chapter-4: A homologous series-F is nematogenic, while series-E is nematogenic and smectogenic. In series-E lower members **E7** to **E12** are nematogenic and higher members **E14** to **E18** are smectogenic. In series-F, the intermediate members **F7** to **F14** are mesomorphic while the remaining lower members **F2** to **F6** and upper members **F16**, **F18** of the series are non-mesogenic. The appearance of mesophase and the phase range depends on molecular flexibility. Intramolecular hydrogen bonding, significantly affects the mesomorphic behavior of studied homologous series.

Chapter-5: The lower members are nematic; the medium members are both nematic as well as smectic, and the higher members are smectic only. It is found that as the length of the terminal alkoxy chain increases, the stability of the smectic phase increases, while the stability of the nematic phase decreases. In the present series, the obtained mesophase type is nematic/smectic or both; the phase stability of the obtained mesophase; its mesophase range depends largely on the flexibility of the molecule. The mesomorphic result indicates that the mesophase range in the cooling scan is wider than the heating scan. The results of the DFT calculation show that the calculated polarization, dipole moment, and stability increase with the increase of chain length.