

PI: Dr. Banani Adhikari (Das), Associate Professor, Siliguri Institute of Technology

Description of DST funded Research Project:

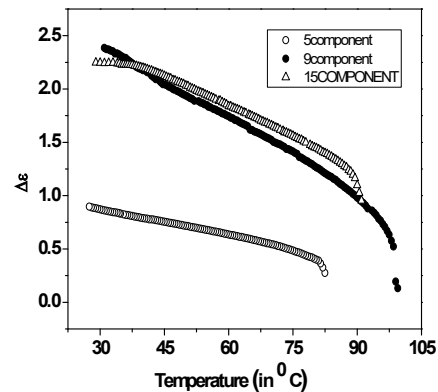
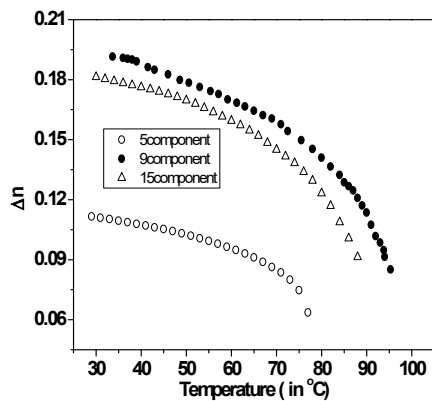
Title: Development Of Liquid Crystalline Materials With Optimum Properties For Application In Vertically Aligned Mode Liquid Crystal Displays DST No: SR/S2/CMP-29/2007 dated 11.06.08

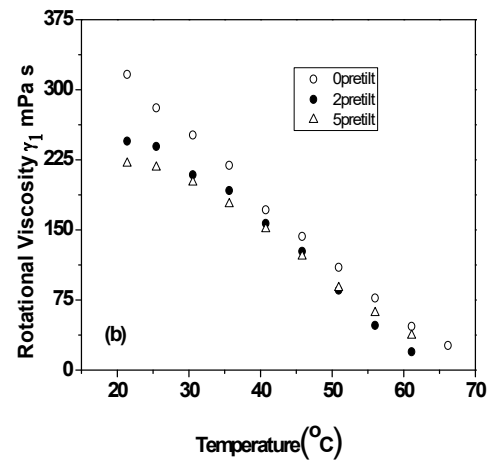
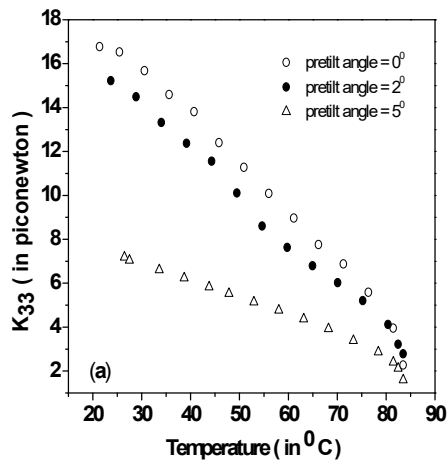
Duration: 2008-2011

Total Cost: Rs. 34,28,000.00

Objective: Preparation of multi component mixtures from suitably selected pure components and optimization of their physical properties from optical birefringence, dielectric anisotropy, elastic constant and rotational viscosity measurements.

Outcomes: Multicomponent mixtures for their applicability in Vertically Aligned Mode LCD's have been developed. Starting from simple three component mixtures a systematic formulation of several multicomponent mixtures were undertaken and their mesomorphic properties were investigated from dielectric, birefringence and visco elastic measurements. The visco-elastic properties of the different multicomponent mixtures were also measured using various pretilted cells (2^0 and 5^0 pretilt) having the wedge – cell technique. The results obtained from this study were then compared with the mixture filled in 0^0 pretilted cell. A remarkable change in the bend elastic constant (K_{33}) and rotational viscosity (γ_1) parameters were observed which enables to reach mixture specifications quite close to the commercially viable values. It is found that as the pretilted angle is increased from 2^0 to 5^0 , the improvement in these material parameters from display application point of view becomes clearly visible. The selective pretilting reduces the apparent tilt angle, i.e., the angle between the projections onto the substrate plate of the nematic layer normal and the director in the uniform states, which has a better effect on switching time, threshold voltage and the display contrast.





PhD produced from this project: One full time fellow Dr Prajnamita Dasgupta and one part time fellow Dr. Anamika Pramanik.

Publication: 09 Papers in international journals

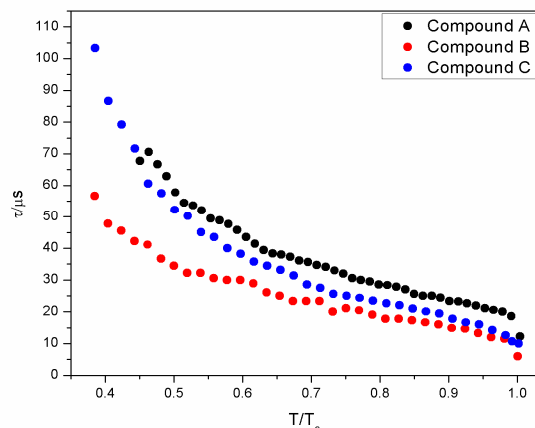
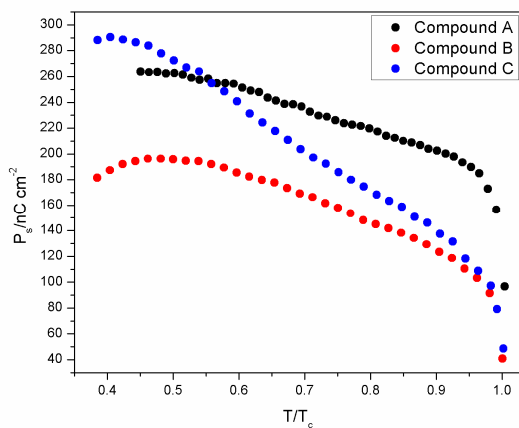
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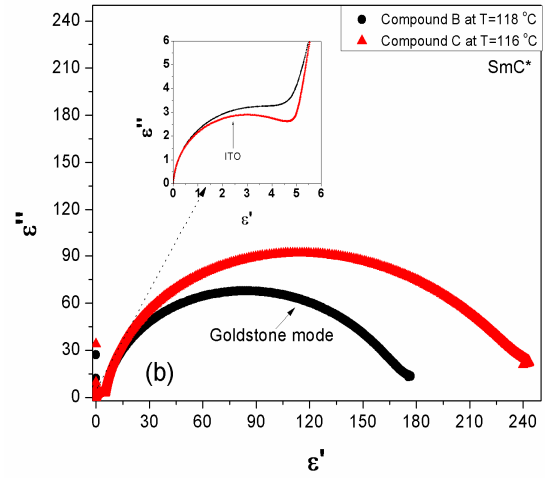
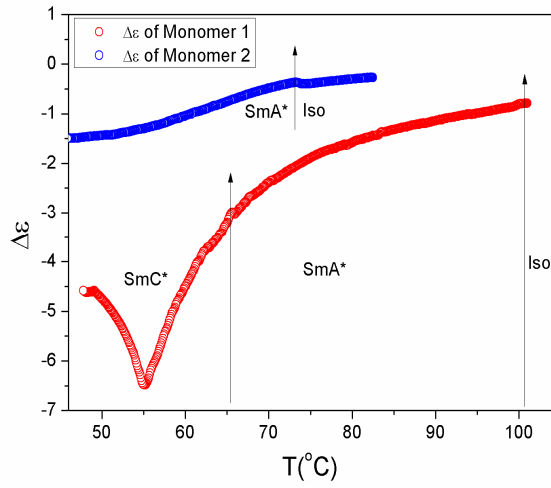
Title: Development of Antiferroelectric Liquid Crystalline Materials for Application in Optical Modulators with Symmetric Switching Times (EMR/2016/005001). Total Cost:

Duration: 2017-2021

Total Cost: Rs. 38,35,920.00

Objective: Development of antiferroelectric liquid crystalline materials with sub-millisecond and symmetric switching times as well as very high optical quality - high tilt angle and helical pitch - for application in optical and photonic devices.





PhD under supervision: Mr. Shantiram Nepal

Publication: 06 Papers in international journals