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**Summary of THE FINAL REPORT OF THE WORK DONE ON THE PROJECT**

**1. Title of the Project:** A Study of Synthesis and Characterization of Liquid Crystalline Substances

**2. NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR:** PROF. SHAH MIHIRBABU HARIHARBHAI, J. AND J. COLLEGE OF SCIENCE, COLLEGE ROAD, NADIAD – 387001, DIST: KHEDA, GUJARAT

**3. DATE OF IMPLEMENTATION** 01<sup>ST</sup> JULY 2013

**SUMMARY OF THE FINDINGS:** The homologous series is synthesized with p-n alkoxy benzoic acid and p-n alkoxy benzoyl chloride linkage with azo-ester compounds. Various mesogens were prepared and characterized thoroughly for the different mesomorphic correlation and magnetic properties. The initial identification with the help of FTIR spectroscopic correlation suggested the presence of various structural presence at different wave numbers. Also the homologous series showed the overall linearity in UV-Spectrophotometry. The liquid crystalline phase were identified for solubility with different oils, surfactant and co-surfactant which would give different mixture possibility for

the liquid crystalline phase with the help of phase diagram. The phase diagram suggested that 23 % Oil mix, 43 % Smix shows highest solubility with stability for synthesized compound. The same were further taken for the synthesis with DOE 3<sup>2</sup> Full Factorial Design with variable of Particle size, Viscosity and Zeta Potential. Liquid Crystals which were prepared showed  $25.053 \pm 0.586$  d.nm size in dynamic light scattering and zeta potential showed -3.56 mV. This along with texture study and magnetic study shows that unique properties were characterized and showed that metal-free formation of liquid crystals with very less particle size and very good particle stability. This Liquid Crystal Phase formulation showed nematic phase stability at different temperatures. The research is very nascent stage for the metal-free magnetic liquid crystalline phase and development in different microemulsion or gel or nanogel may open the strong opportunity of research.