CHAPTER - III

AIM AND OBJECTIVE

Polyurethanes a class of materials, which are used in general and industrial applications. Polyurethanes are usually synthesized by the reaction of polyfunctional isocyanates with the polyols or other reactants containing hydrogen donors that are reactive with isocyanates. The components of polyurethanes can be varied to produce hard segment is increased the hardness of elastomeric increases. The combination of polyols, diisocyanates and low molecular weight chain extenders give rise to a multiple forms suitable for extremely different practical applications as fibers, paints, foams, resins, elastomers, biomaterials and many others.

Accounting for the rising prices of petrochemicals and due to environmental concern, present study has been carried out with an aim to manufacture the rigid polyurethane form natural and eco-friendly source. In this regard cashew nut shell liquid, an agriculture by-product of the cashew industry which is one of the few major and economic source of long chain phenols hold considerable promise as a versatile raw material for polymer production. Cardanol, a penta decenyl phenol is one of the major constituents of cashew nut shell liquid. Compared with conventional phenolic resins, cardanol based polymers have improved flexibility and reduced brittleness, improved processability, heat and chemical resistance, best water repellence, resistance to weathering, antimicrobial properties and insect resistance.
Therefore it is particular interest to develop smart polyols that may be easily and cheaply obtained from readily available and renewable resource material, CNSL. Its use in the preparation of smart polyols suitable for making high performance cross linked polyurethanes which are resistant to hydrolytic, oxidative, thermal degradation is not reported.

The major objective of this work was to synthesize cardanol-based multifunctional and multisegmented smart polyols as efficient active hydrogen compound and preparation of high performance cross-linked polyurethanes for specialty applications. Introduction of a smart polyols having multifunctional macromolecular structure which can impart the combined character of hard and soft segments in cross linked polyurethanes may improve the properties of polyurethanes for specialty applications.

Therefore, it was planned to synthesize multifunctional polyol terminated cardanol novolac resins as an active hydrogen nucleophilic compound having the combined character of hard and soft segments for the preparation of three dimensionally cross linked polyurethanes.

The objectives of the present investigation were

- Synthesis and characterization of three types of cardanol/m-cresol based active hydrogen nucleophilic multifunctional novolac resins.
- Synthesis and characterization of three types of polyol terminated cardanol/m-cresol based resins.
➢ Synthesis and characterization of polyurethanes from cordanol/m-cresol-formaldehyde novolac resins as well as polyol terminated resins.

➢ To study the effect of addition of m-cresol to polyurethane matrix.

➢ To investigate the influence of incorporation of different metals, their dispersion in the polyurethane matrix.

➢ Functional evaluation and correlation of structure-property relationship of newly prepared cross linked polyurethanes under aging conditions.

➢ Identification of candidate cross linked polyurethanes for potential applications.