

PREFACE

Very recently the synthesis of a new class of linear polymers consisting of recurring conjugated azomethine bonds has aroused considerable interest. The methods used for the purpose include the conventional hetero-polycondensation reactions using different types of catalysts and subsequent transformations in the polymer chains. Direct routes of synthesis, namely, homopolycondensation and ring-opening polymerisations have also been reported. However, an extremely thermostable character coupled with semi-conductivity and inertness towards common solvents have made these materials offer immense possibilities.

In the present series of investigations, as embodied in the thesis, attempts have been made to prepare poly-hetero-conjugated polymers from urea and dicyanodiamide and the copolymers of urea and o-tolyl or m-tolyl urea, under severe conditions of temperature and pressure. Their chemical structures have been established by the usual methods and they were characterized by a systematic studies of their various properties.

The subject matter of the thesis have been presented in five chapters altogether. A brief review of the earlier work on other such systems has been compiled in chapter I. A brief outline of the scope of the present investigations has also been given there.

The experimental procedures adopted for the measure-

ment of various properties have been given in chapter II along with a discussion of the theories and principles involved.

The results of the experiments given in chapter III, have been presented in five sections. The effect of reaction conditions on the yields of the polymers have been recorded in sub-section (1). Results of viscosity measurements have been given in sub-section (2). Sub-section (3) contains the results of measurements of osmotic pressure, section (4) those on Thermogravimetric analysis and section (5) the results of dielectric measurements.

Mechanisms of the polymerisations, elucidation of structures, discussion of the viscometric, osmometric and the dielectric properties have been set forth in chapter IV. The chapter V is a summary of the results of investigations with concluding remarks.

The author has freely consulted the Chemical Abstracts, Reviews, Journals and the standard text books on the subject in the preparation of his manuscript.

The complete work on the polymer from urea, which forms a major part of the thesis, was already communicated in the form of a paper to the Journal of Polymer Science, Part A-1 and has been accepted for publication. The work on the other polymer presented in the thesis is being made ready for communication.