CHAPTER V
CONCLUSIONS

"Oxide One Pot Synthesis", "OOPS" process , is one inexpensive and direct way to produce alumatrane complexes. In this thesis work, alumatrane complexes were synthesized directly from $Al(OH)_3$ and TEA. The precipitated products were characterized by FTIR, TGA, viscometry and light scattering techniques. Effect of TEA concentration, reaction temperature, reaction time and TETA concentration were investigated. We found that the structural characteristics of the products, % ceramic yield, intrinsic viscosity, hydrodynamic radius, etc., depend on these parameters. The percent ceramic yield of the alumatrane complexes from the reaction without TETA content was 33.1%, higher than the % ceramic yield from the reaction with TETA content which was 29.1%, implying that TETA catalyzes the reaction and longer chains are formed.

From the viscosity measurement, intrinsic viscosity was found to increase toward the maximum value, when TETA content was above 150 mmol. This is the optimum TETA content which yields alumatrane complexes having a maximum hydrodynamic volume. Light scattering measurements also confirm this result; the hydrodyanmic radius was found to increase from 108 nm to 170 nm, when TETA content was varied from 10 to 150 mmol.

Huggins and Kraemer coefficients data suggest that ethylene glycol is always a poor solvent, under present experimental conditions. This result is in agreement with the dynamic light scattering measurements which indicate a negative dependence of the complex diffusion coefficient on polymer concentration.

The effects of TEA concentration and reaction time on the intrinsic viscosity of the complexe products are similar to the effect of TETA ; the optimal TEA concentration and reaction time were found to be 100 mmol and 5 h, respectively. The effect of reaction temperature is to induce the complex viscosity or the hydrodynamic volume to increase linearly with reaction temperature.