CHAPTER V
CONCLUSIONS

In this thesis work, alumatrane complexes of $Al(OH)_3$ and TIS were synthesized directly via the one step process, so called the "Oxide One Pot Synthesis" process. The reaction conditions, the mole ratio of TIS, the reaction time, the reaction temperature, and concentration of catalyst, TETA, were found to influence the characteristics of the product. From TGA data, the percent ceramic yields of the product from the reaction without and with TETA were 32.1% and 26.1%, respectively, meaning that TETA catalyzed the reaction to result in higher organic ligand to alumina ratio.

The capillary viscometer was used to investigate the physical properties of the product in dilute solution. It was found that the intrinsic viscosity and the overlap concentration were affected by the reaction conditions. The more organic content gave the higher viscosity because the polymer is more rigid and high molecular weight which coincided with TGA data.

Light scattering measurements revealed that the product with a higher catalyst concentration gave a larger hydrodynamic radius R_H. Comparison of $[\eta]$ and R_H values indicates that a higher molecular weight polymer is produced when the higher catalyst concentration is used. Furthermore, from the data of k', k'', and k_D, we found that ethylene glycol is a poor solvent for this polymer system. The polydispersity of the polymer is larger for the polymer with 50 mmol TETA compared to 150 mmol TETA, meaning that at low TETA content, the product consists of many sizes of polymer unit more than that from higher amount of TETA.