CHAPTER 8

CONCLUSIONS AND SUGGESTIONS

8 CONCLUSIONS AND SUGGESTIONS

8.1 Conclusions

The highest electrical conductivity obtained for the chitosan-$AgCF_3SO_3$ system is of the order 10^{-5} S/cm. The conductivity takes place via some hopping mechanism which could have taken place when the vibrating complexed site comes in close proximity with one another and the cation of the salt has sufficient activation energy to hop onto the next uncomplexed site.

XRD, FTIR and also XPS studies have proved complexation. The shifts in peaks from XRD and FTIR was thought to be due to chitosan-acetate salt formation but as the shifts continue towards lower wavenumbers and some overlaps between band are observed, complexation between the salt and the heteroatom seems to be justified. XPS can be considered as the complexation confirming technique.

In the present study when more than 0.5 g of silver salt is added to the plasticized chitosan acetate-silver triflate salt system, fractals were observed. The high concentration of salt and the characteristics of doped chitosan that is hygroscopic at room temperature have influenced fractal growth. Fractals are ignited from a nucleation centre and grow in a certain direction away from the nucleation sites through the microvoids of the chitosan structure. The ends of the fractals are charged and a definite boundary can be observed between the fractals originating from opposing direction.

Solid state cells have been fabricated using the film that has the highest electrical conductivity value. The performance of the cells is dependent on the internal resistance. The internal resistance of the cell fabricated is greater than the bulk resistance of the electrolyte. This is attributed to the interfacial resistance between the electrolyte and the electrode. The OCV of each cell is about 0.557 V.

8.2 Suggestions for Further Work

The electrical conductivity should be enhanced up to about 10^{-2} S/cm at room temperature. This should be useful for the fabrication of batteries. As a second suggestion, the chitosan biopolymer should be blended with a polymer of very low glass transition temperature so as to produce a blended product that may have a lower glass transition temperature and softer backbone.