

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Various cladding types were prepared. Polycarbonate was used as a core material. The fibers were produced by co-extrusion technique. The processing parameters were determined in order to find the optimum condition. The obtained fibers were then characterized mechanical and optical properties in order to study the effect of processing parameter (piston speed ratios of core and sheath) and types of cladding. From the results of this study, it can be concluded that:

1. Poly(arylene silyl ether)s (PASE) was successfully synthesized by using Et_3N as a catalyst and DMAP as a co-catalyst. The ratios of monomers are influence on the molecular weight of polymers. PASE which have $M_w = 37,443$ with $M_n/M_w = 1.69$ are achieved at ratio diphenol:silane equal to 1:1.25.
2. The PASE/PMMA blend at every ratios is a good compatibility and behaves more flexible than pure PMMA.
3. The fibers were produced by co-extrusion process. Some of the obtained fibers have not good shape; some fibers have bubble inside them. The dimensions of fibers are not so quite difference even the processing parameter were varied.
4. The PASE/PMMA cladding can induce PC core fibers to brittle fiber. Young's modulus and tensile strength of all type fibers are in the same range of pure PC. The obtained fibers also have tensile strength close to the research of such as Guerrro H., *et al* (1998) and Orth P., *et al.* (1998).
5. The fibers exhibit quite the same numerical aperture that is about 0.8. The attenuation is difference which depends on the fiber's

dimension and uniform cladding thickness. These affect on the optical loss.

6. The optical fibers which were developed in this work are higher attenuation than commercial POFs.
7. The fibers with thicker clad lost the light, while they were bended, less than the fibers with thinner clad.
8. The maximum operating temperatures of the fibers are higher than 100 °C. Comparing with the same type of cladding; the operating temperatures are reduced when decreasing in cladding thickness and core diameter.

7.2 Recommendations

A cladding material for PC core should exhibit good toughness, high transparency. Viscosity of two materials is the key to achieve well concentric circle of core and clad. The manufacturing process should make fiber well in shape without bubble inside in order to reduce optical loss.