

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

For the effect of antioxidant on processing stability, primary antioxidants and compounds containing primary and secondary antioxidants can help HDPE polymers to be recycled several times without significant changes in MFI. However, the recommended ratio of primary to secondary antioxidant was found to be 0.5/0.5.

The optimum ratio of primary to secondary antioxidant was found to be 0.025/0.075 for poor waste management regions, because this ratio causes degradation at short times. So pollution from HDPE garbage from throwaway products (plastic bags, drinking water bottles, etc.) have limited effect on the environment. For regions that have fair/good waste management, the recommended ratio of primary to secondary antioxidants is 0.05/0.05 using only 0.1% of primary antioxidant, because the HDPE can be recycled several times.

Results from oxidative induction time tests agree with FTIR analysis, i.e. the resistance to thermal degradation was proportional to the amount of primary antioxidant used.

For the effect of antioxidant on degradation rate at high temperature, a primary and secondary antioxidant ratio of 50/50 gave the minimum rate of decomposition of HDPE.

5.2 Recommendations

Commercial grades of HDPE contain both antioxidants and UV-stabilizers. For future work, it is recommended to study the effect of UV-stabilizers on the light stability of HDPE. It is also recommended to study the degradation kinetics of stabilized HDPE to determine its lifetime.