

CHAPTER IV

CONCLUSIONS

1. S_R varies between 0.065-0.084 for HDPE. S_R varies between 0.139-0.222 for LLDPE and MDPE. The onset of sharkskin extrudates is possibly related with the initiation of disentanglement and reentanglement for chains confined with the thin melt layer at the interface. The onset is solely material dependent; it is independent of the flow geometry or the past stress or strain rate history.

2. The sharkskin parameters, λ_S/ε_S depends on both the material rheological parameters and flow history. This dependence stems from the facts that the time scales of relaxation during solidification depend strongly on the severity of disentanglement and reentanglement. Consequently, a large variation of λ_S/ε_S (between 4.2-5.2) can be obtained when molecular weight, die geometry or temperature are varied, whereas the recoverable shear remains nearly unique.

3. Finally, a stability diagram of sharkskin defects can be uniquely constructed in the $S_R - \lambda_S/\varepsilon_S$ plane ; separating sharkskin regimes of LLDPE (L2009F, L2020F), MDPE (M3204RU) and HDPE (N3260, H5690S, R1760) from steady state flow regimes with smooth extrudates.