

## CHAPTER V

### CONCLUSIONS

1. The oscillating stress regime was found when the molecular weight was greater than  $2.4 \times 10^5$  g/mol. There was no hysteresis or memory effect for the oscillating stress regime and this regime shifted to the higher shear stress and shear strain rate as the temperature increased. In addition, the magnitude of fluctuation decreased as the temperature and polydispersity increased.

2. For wall slip determination, we found that our results are qualitatively consistent with the Brochard and de Gennes (1992) model, disentanglement mechanism. For first regime, the entangled slip regime,  $b_0$  decreased as the molecular weight increased with the scaling exponent of -0.36 but increased as polydispersity increased. And  $b_0$  exhibited the temperature independence. Second regime, the marginal regime, the extrapolation length,  $b$ , depended on  $V_s$  with the scaling exponent in the range of 0.42-0.68; but it was independent on the polydispersity and temperature effects. Lastly, the rouse regime, only H5604F HDPE and H5690S HDPE ( $M_w \geq 2.4 \times 10^5$ ) were observed.  $b_\infty$  increased as polydispersity increased but decreased as temperature increased with the scaling exponent of -1.21.

3. Normalized flow curves, plots of  $\tau_w / G_c$  ratio versus  $Wi$ , did not collapse well as we varied molecular weight and polydispersity. Moreover a bending of curve was observed when the elasticity was predominant. For the temperature effect, the normalized flow curve approximately collapsed at low Weissenberg number.