

CHAPTER IV

CONCLUSIONS

In the above study of the hydrodynamic properties of dilute aqueous solutions of hydroxypropylcellulose (HPC) in the presence of two different types of surfactants, CTAB and OTG, we found strong evidence that CTAB can bind to hydroxypropylcellulose, whereas the interaction of HPC with OTG cannot be detected.

In the case of the HPC/CTAB/water system, measurements of hydrodynamic radius (R_h) from dynamic light scattering analysis corroborate the results from the specific viscosity (η_{sp}) measurement. Both experiments indicate a pronounced polyelectrolyte effect, imparted to the neutral HPC chain on formation of a charged complex with the cationic surfactant CTAB. The strong chain expansion, illustrated by increases in R_h and η_{sp} , is reduced in the system when the saturated binding concentration is exceeded at the CTAB/HPC concentration ratio of about 0.182, when free counterions from the excess CTAB are present. The ionic strength of this system was varied by adding salt. The salt apparently serves to screen the electrostatic interaction and also to stabilize the bound micelle in the complex.

In the case of the HPC/OTG/water system, we observed no change in the critical micelle concentration (CMC) measured by surface tension technique when the polymer was added to OTG/water solution. The results from both dynamic light scattering and viscosity measurements also show no evidence of an interaction between HPC and OTG.