

## CHAPTER VII

### CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 Conclusions

In this research, the adsorption isotherms of four surfactants (CPC, DBSA, C7BzO and NP30) were considered. Admicellar polymerization of PMPS on NR particles was studied. The suitable conditions for admicellar polymerization were investigated. The adsorption isotherms of CPC, DBSA and C7BzO demonstrated the bilayer adsorption which could be formed to allow admicellar polymerization while NP30 revealed the forming of monolayer adsorption for all NR content and the amount of surfactant adsorption was decreased with NR content. The adsorption isotherm of C7BzO at pH 3 was higher than pH 8 at all NR content resulting from the steric effect from the head group of surfactant and the amount of surfactant adsorption was decreased with NR content. For NP30, varying on the pH value presented a significant changing on the adsorption of the surfactant on the surface of NR particles. The amount of surfactant adsorption of NP30 at pH 3.9 > pH 3 ≈ pH 8. The surfactant adsorption was decreased with NR concentration according to the occupied volume of surfactant resulting from the steric effect of the chain length. The products from admicellar polymerization were characterized by particle size analyzer, FT-IR, TGA, FE-SEM, EDX and TEM. The results from particle size analyzer revealed that the size of PMPS-ad-NR was increased with MPS content. FT-IR spectrum of PMPS-ad-NR exposed the combination of characteristic peaks of NR and PMPS. Furthermore, the peak intensities disposed to be stronger when the MPS concentration increased. The PMPS-ad-NR decomposition curves presented the single transition like one single component of NR. When PMPS content was increased, the tail of the transition was shifted to end at higher temperature together with significant residue content. From FE-SEM and EDX, the synthesized products demonstrated the full coverage of PMPS over NR particles and exhibited the uniform dispersion of Si all over the samples. From TEM exposed that the core NR was fully coated by PMPS.

## **7.2 Recommendations**

For the future work, the effect of salt on adsorption isotherm, the type of initiator, the monomer:initiator ratio and the time for polymerization can be varied to study the effect of these parameters on the amount of PMPS coated on natural rubber particles. Moreover, some of physical properties should be studied such as impact strength, tear resistance, fatigue/flexing resistance, resilience and abrasion test, etc.