CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this work, the influence of the complex polydispersed nature of asphaltenes on their aggregation kinetics was investigated. Time and solubility based fractionation were used to separate asphaltenes into sun-fractions and therefore being less polydispersed. Early precipitated asphaltenes have higher aggregation rate, solubility parameter and tendency to associate into larger nanoaggregates than the ones precipitated later. Polydispersity of asphaltenes are believed to be altered at different asphaltene concentrations by the stabilizing power of soluble asphaltenes causing asphaltenes precipitated from higher asphaltene-content fractionated at identical time and solubility become more stable than the fractions precipitated from lower-asphaltene content. The role of soluble fraction or the most stable asphaltenes in mixtures of least stable asphaltenes was also investigated. The most unstable asphaltenes, which expected to cause many difficulties in oil productions, become more stable when the fraction of the most stable asphaltenes increases in the mixture.

5.2 Recommendations

From this work, it was elucidated that asphaltenes precipitated at different times have different aggregation tendencies as a result of the complex polydispered nature of asphaltenes. Since, time and solubility based fractionation of asphaltenes can successfully diminish the polydispersity of asphaltenes and it has also been observed from many studies that asphaltenes extracted from different techniques (e.g. solvents and n-alkane precipitants) exhibit different in their properties. Therefore, it is a great deal to utilize time and solubility based fractionation to separate asphaltenes precipitated from different solvents and precipitants which could provide pronounced findings regarding the complicated properties of asphaltenes.

In addition, it was shown in this work that least stable and most stable asphaltenes have strong influence in controlling the stability of asphaltenes. It is therefore interesting to focus on understanding the role of the most unstable asphaltenes which are expected to be the most problematic portion for oil productions. Further fractionation of the most unstable asphaltenes along with performing deposition experiment would provide a better understanding on the properties of asphaltenes that make asphaltenes become unstable and precipitate out of solution. Moreover, fractionation of the most stable fraction is expected to provide a better understand in the role of stabilizing unstable asphaltenes in high asphaltene-content system.