CHAPTER VI
CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This work has shown that the coldfinger apparatus is a sufficient and reliable means to investigate the effect of system composition on wax deposition. A proper experimental method for the coldfinger has been developed. A wax prediction model for the coldfinger was also developed using mass and energy balances. In this work, the effects of composition on n-alkane deposition were studied. Conclusions that can be made from this work as follows:

1. For monodisperse systems, the deposit mass and deposit wax fraction increase with system cloud point, showing that system solubility is the main driving force for monodisperse deposition.

2. For independent crystallized binary systems, the total wax fraction and deposit mass are roughly the same, although the percent of wax present is double. However, when the percent of wax is doubled, the cloud point still remains roughly the same. Thus, system solubility is still the main driving force for deposition. Moreover, the presence of less soluble materials enhance the deposition of more soluble materials when compared to the monodisperse system.

3. For cocrystallized systems, the deposit mass and wax fraction increase with the system cloud point. However, these trends are shifted lower when compared to the independent crystallized system trends. When cocrystallization occurs, it decreases deposit mass, percent of total wax fraction, and deposit amount of less soluble material dramatically.

4. The deposit mass does not increase with system wax content, but it is a function of the system cloud point, which is primarily dependent on the less soluble material.

5. Stearic acid decreases the percent of wax deposited non-linearly, having more effect on C_{32} than C_{36}.

6.2 Recommendations

To futher study the effect of composition on wax deposition, the following topics should be investigated.

1) Dynamic wax deposition: This investigation could provide insight on how cocrystallized and independently crystallized systems evolve with time. The coldfinger would be used for this investigation.

2) Deposit yield stress: To investigate the effect of cocrystallization on wax deposition further, deposit yield stress is an interesting property to investigate, because the yield stress of the deposit will help in developing shear reduction term in balance equations and help to gain a better understanding on how high the rate of cocrystallized deposition is by compared to the result of this work. To investigate this, gel having the same composition as the deposition result would be investigated by using a rheometer.

3) Crystal structure of the deposit: This is an interesting issue because cocrystallized crystal aspect ratio could be different when compared to the independent crystallized deposit. α can provide a better insight into the yield stress result and improve the accuracy of the model.