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APPENDICES

Appendix A Population Balance Model Fit

As discussed in section 4.2, to obtain collision efficiency, a population balance model was used and population balance model fits are shown below.

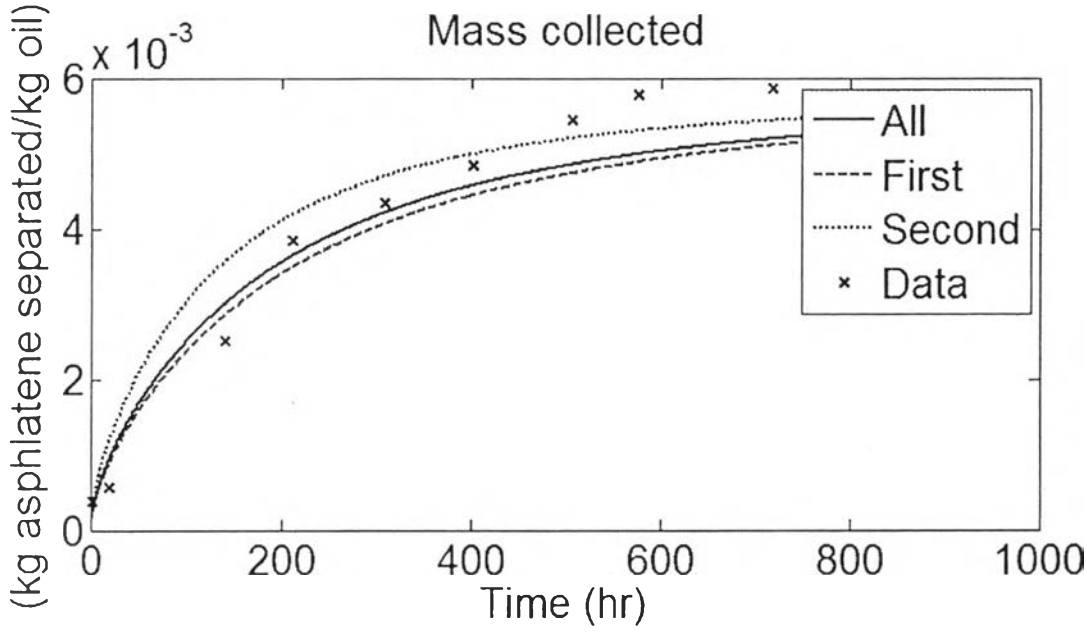

Figure A1 Amount of asphaltene precipitated as a function of time at minimum SSE between the simulated results using all, the first portion, and the second portion data and experimental results for Oil A at 60°C and 30 vol. % heptane.

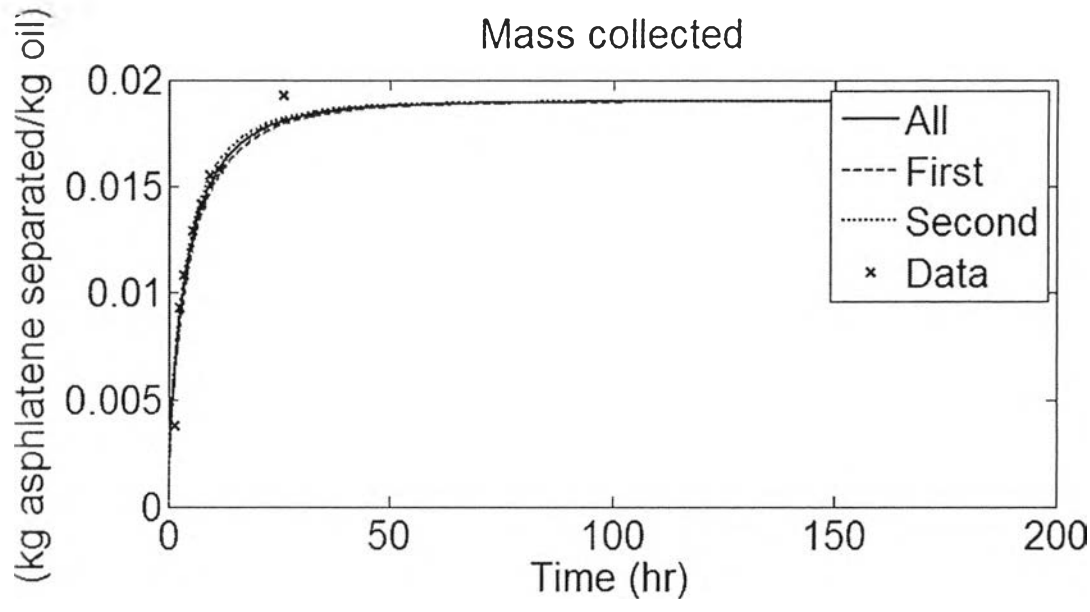

Figure A2 Amount of asphaltene precipitated as a function of time at minimum SSE between the simulated results using all, the first portion, and the second portion data and experimental results for Oil A at 60°C and 35 vol. % octane.

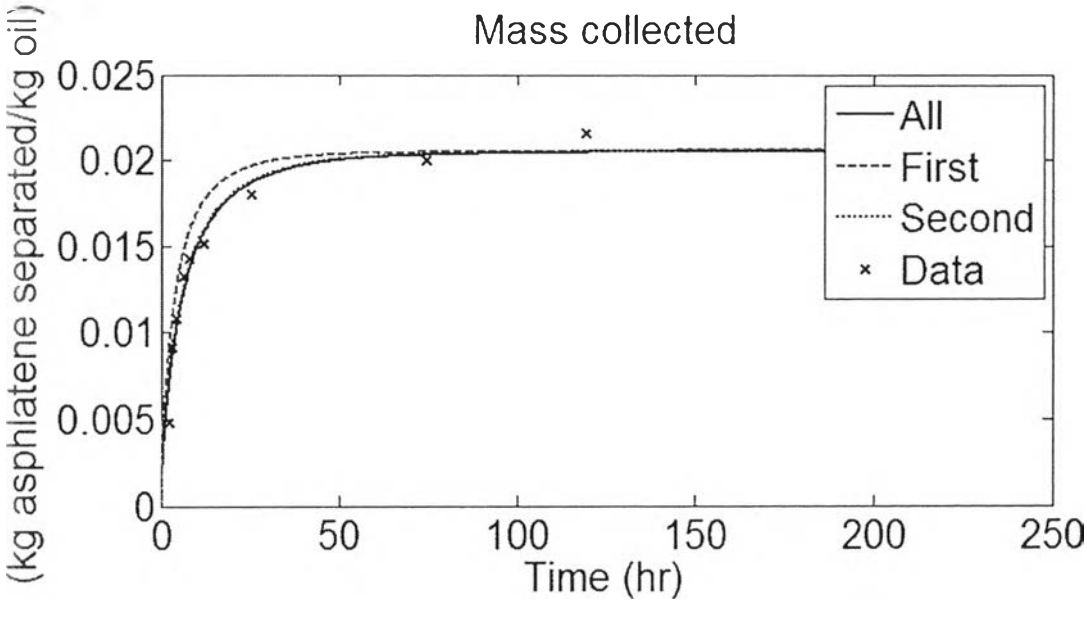

Figure A3 Amount of asphaltene precipitated as a function of time at minimum SSE between the simulated results using all, the first portion, and the second portion data and experimental results for Oil A at 60°C and 35 vol. % nonane.

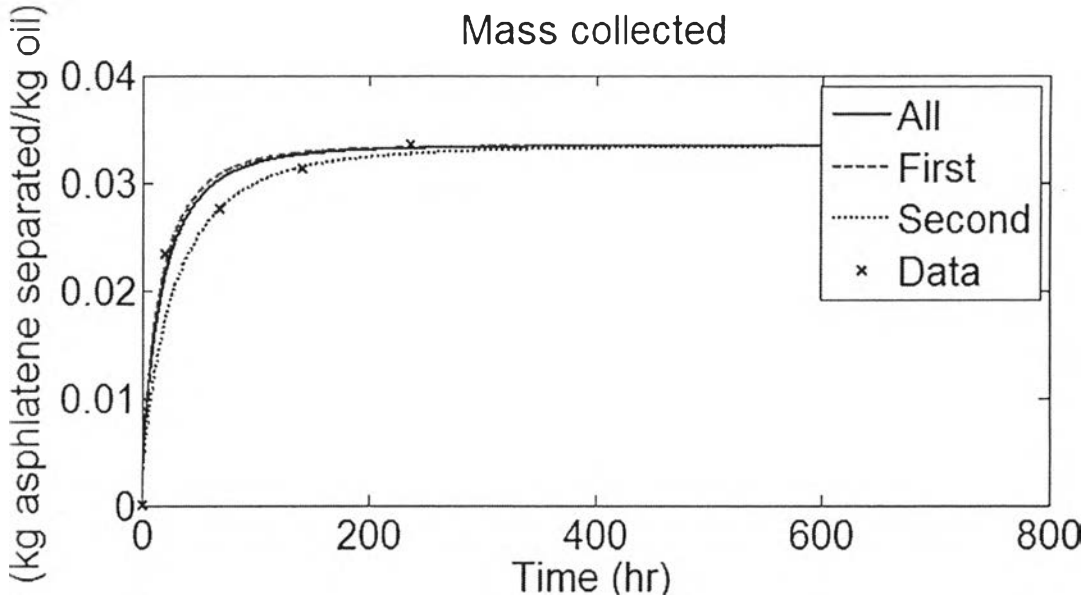

Figure A4 Amount of asphaltene precipitated as a function of time at minimum SSE between the simulated results using all, the first portion, and the second portion data and experimental results for Oil A at 60°C and 35 vol. % decane.

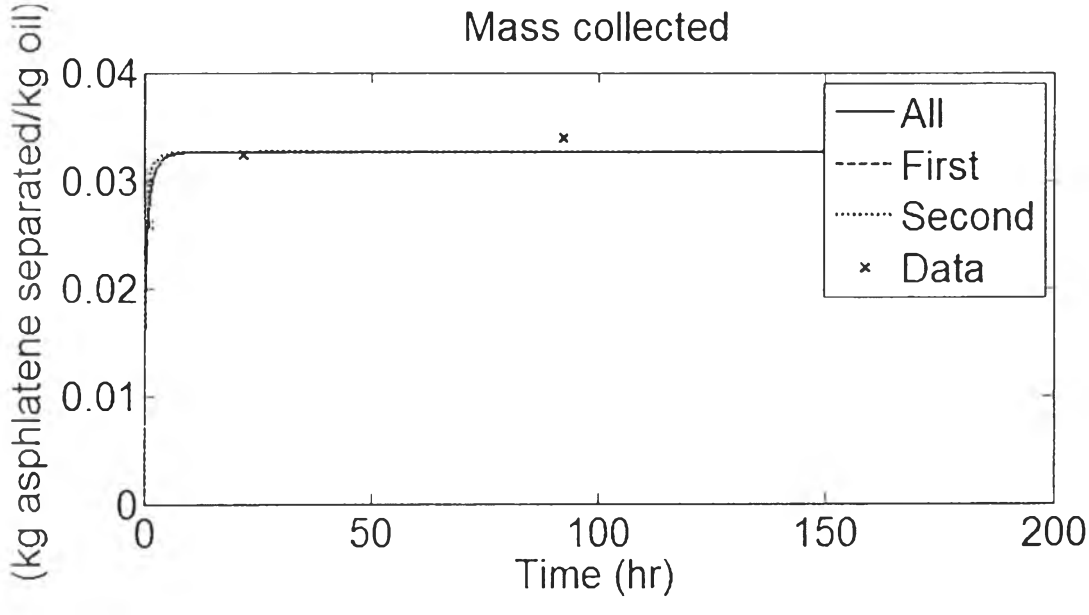

Figure A5 Amount of asphaltene precipitated as a function of time at minimum SSE between the simulated results using all, the first portion, and the second portion data and experimental results for Oil A at 60°C and 40 vol. % decane.

Appendix B Onset Time of Oil A

In order to define the onset time, the time to detect unstable asphaltenes (0.5 μm detection size), optical microscopy was used and the results are show below. The haze time, left image, is the time that started to observed asphaltenes and the precipitation time, right image, is the time that the size of asphaltenes exceed 0.5 μm. These were averaged to estimate the onset time.

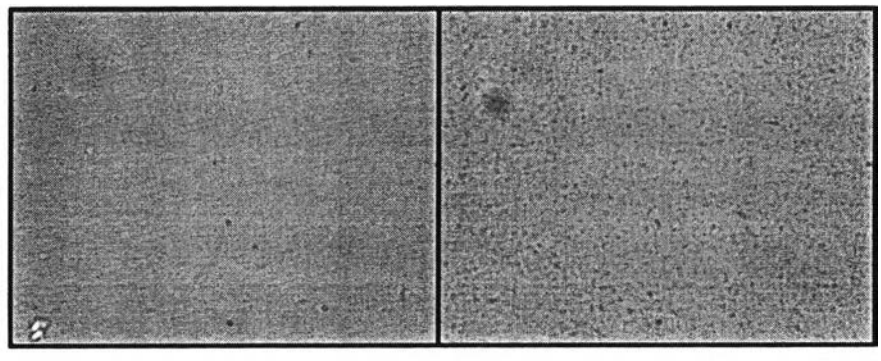

Figure B1 Optical Microscopy for Oil A at 60°C for 35 vol. % heptane.

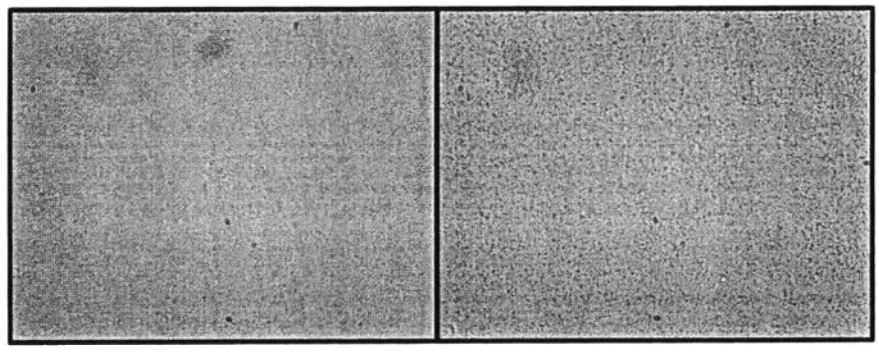

Figure B2 Optical Microscopy for Oil A at 60°C for 35 vol. % octane.

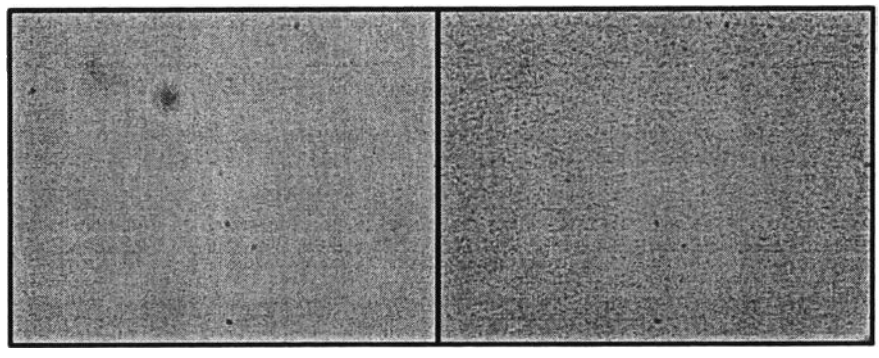

Figure B3 Optical Microscopy for Oil A at 60°C for 35 vol. % nonane.

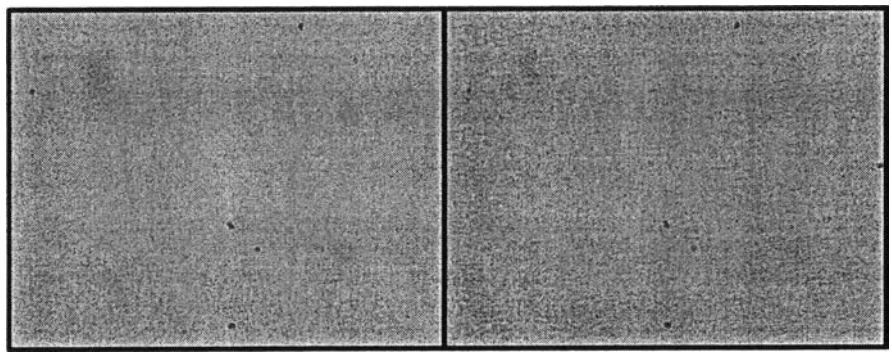

Figure B4 Optical Microscopy for Oil A at 60°C for 35 vol. % decane.

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Presentation:

1. Chaisoontornyotin, W.; Hoepfner, M.; Haji Akbari Balou, N.; Malakul, P.; and Fogler, H.S. (2013, June 10-13) The Effect of Precipitant on Asphaltene Aggregation and Deposition. The 14th International Conference on Petroleum Phase Behavior and Fouling, Rueil-Malmaison, France.