CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this study, the minimum energy required to create colloidal gas aphrons for one set of solution condition was determined. Also, stability and gas hold up were measured for CGAs created from one ionic surfactant, Alfoterra 145-5PO Sulfate; this allowed selection of the optimum speed for diesel removal experiments. The formation of CGAs was carried out by studying the effect of stirring speed, stirring time, surfactant concentration and salinity on stability and gas hold up of CGAs dispersions. Maximum stabilities and gas hold up were obtained at high surfactant concentration. An addition of salt, i.e. high ionic strength, caused a decrease in stability of CGAs, implying that electrostatic forces play an important role in the formation and stability of CGAs. Diesel removal using CGAs may be a viable alternative to froth flotation. It is possible to obtain high enrichment ratio and oil removal into the aphron phase at optimum conditions. In froth flotation operations, air flow rate used in the operation should be optimized to obtain the proper balance between the foam production rate and the water back-entrainment rate in order to achieve the high performance in froth flotation. CGAs can be employed in froth flotation processes for the treatment of oily wastewater. The oil droplets tend to adhere to the outside of this film; a number of droplets can be accommodated on each aphron and separated by froth flotation. The system with 0.1 wt% Alfoterra, 3 wt% NaCl, stirring speed of 5000 rpm, stirring time of 5 min at air flow rate 0.30 L/min gave a high oil removal up to 97.07 %. The result showed that CGAs enhanced oil removal in the froth flotation operation because of higher foam ability and foam stability. The non-equilibrium system was found to have a higher oil removal than that in equilibrium system because in the equilibrium system, a large fraction of surfactant is present in a bicontinuous structure in the middle phase and are not well transferred to the foam.

5.2 Recommendations

Based on the experimental results, the following recommendations are suggested for futures studies:

1. To study the more hydrophobic oil such as motor oil in microemulsion formation.
2. To investigate the removal efficiency of motor oil from wastewater using froth flotation applied with gas aphrons.
3. To study the removal efficiency of motor oil from wastewater using froth flotation in continuous mode.