CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this study, the magnesium-HEDP precipitates were synthesized by titration technique. The precipitate compositions were analyzed by AAS and Hach Technique. The morphologies of precipitates were observed by SEM. Then the crytallinity of precipitates were examined by XRD. The batch dissolution experiments were set up for studying the solubility of precipitates. From the experimental results, it can be concluded as follows:

1. The degree of supersaturation had little effect on the precipitate properties. Even though the precipitates were prepared from solutions having different the degree of supersaturation, the resulting precipitates still had the same properties.
2. The pH of precipitating solution and Mg^{2+}:HEDP molar ratio both had the potential to enhance the bonding of magnesium onto HEDP. The HEDP molecules deprotonated more at higher pH values. Therefore, the precipitating conditions affected the molar ratio in Mg-HEDP precipitates.
3. Under the studied conditions, four distinct precipitates were observed. The 1:2 Mg-HEDP precipitate had platelet structure. The 3:2 Mg-HEDP precipitate had two morphologies, spindle and irregular flaky structure while the 2:1 Mg-HEDP precipitate was granular particles.
4. SEM micrographs and XRD patterns of all precipitates revealed that that the 1:2 and 3:2 magnesium-HEDP precipitates were crystalline in nature whereas the 2:1 magnesium-HEDP precipitates was amorphous.
5. An increase in the magnesium:HEDP molar ratio in precipitates resulted in a decrease in equilibrium solubility of precipitates. Therefore the 2:1

Magnesium-HEDP precipitate is preferable for squeeze treatment because it gives the longer squeeze lifetime which is appropriate in preventing the scale from forming for a long period of time.

5.2 Recommendations

In order to study release mechanism of magnesium-HEDP precipitate in porous media, micromodel experiments should be performed. The micromodel unit offers several advantages such that one can see the mechanisms of precipitation and dissolution occurring simultaneously in porous media. The development in the micromodel can be visually observed through a stereo-zoom microscope and recorded by using a super VHS video recorder.

Generally, the actual oilfields contain high concentrations of both magnesium and calcium ions which may interact with each other. Therefore, it is interesting to study the effect of magnesium ion on properties of calcium-scale inhibitor precipitate.