

CHAPTER I

INTRODUCTION

Deposition of asphaltene in the tubing and production facilities has been found to cause a number of severe problems. The asphaltene deposits increase friction in pipeline and production facilities resulting in reduction in the oil production. As the trend of oil production is going toward using more asphaltenic crudes, the economics of petroleum industry is turning to get worse. Asphaltene deposits are becoming a very serious problem in many areas throughout the world. More attention and investment are being put into the research of asphaltene deposition and its remediation. The solutions to asphaltene deposition will have a great impact to the petroleum industry (Leontaritis, 1989).

Generally, asphaltene deposits are removed from the formation by dissolving it into aromatic solvents (e.g., toluene). However, it becomes an environmental concern of using aromatic solvents and so environmental friendly chemicals are getting more attention. One of attempts is to study the stabilization of asphaltene in alkane-based solutions containing a sufficient amount of amphiphiles. It has been found that a micellar solution of alkylbenzenesulfonic acid amphiphiles in alkane appears to be the most effective solvent. The criteria for amphiphile molecules to be effective in stabilizing the asphaltenes in apolar media are the association of amphiphiles to asphaltenes and the establishment of a steric layer around asphaltenes of amphiphiles (Chang and Fogler, 1994a). Dodecylbenzenesulfonic acid in heptane has been shown to be effective in dissolving asphaltene deposits (Chang and Fogler, 1994a). There has not been any research which focuses on aging of asphaltenes under low pressure and reservoir

temperatures. Since aged asphaltenes are existing in a real field, the effect of aging on dissolution of asphaltenes would be very beneficial. The present research focussed on the effect of high temperature and aging time on physical and chemical characteristics of asphaltene. In order to study the change in solubility of asphaltenes, dissolution test was performed using amphiphile/alkane and toluene in a differential reactor. Various analytical techniques were used to distinguish the differences among asphaltene samples.