CHAPTER I
INTRODUCTION

n-Alkanes are generally accepted to be the primary component in crude oil pipeline deposits (Singh *et al.*, 1999; Hansen, *et al.*, 1991; Hennessy *et al.*, 1999). These deposits can cause significant problems for the oil industry, because they can result in lower oil production or higher power consumption (Venkatesan *et al.*, 2005). Wax deposition can occur when the crude oil temperature drops below the solubility limit of longer chained n-alkanes. At typical reservoir temperatures (70-150°C) and pressures (55-103 MPa), the solubility of paraffins in crude oil is sufficiently high enough to keep these paraffin molecules fully dissolved (Singh *et al.*, 2000). However, as the crude oil is transported through a cold environment, its temperature will drop due to heat transfer with the surroundings. If the temperature becomes sufficiently low enough, wax deposition can occur. Recently, advances in offshore drilling technology have made deep water drilling economically feasible, with wells as far as 50-60 miles away from shore (Singh, 2000). As oil and gas production moves to deeper and colder waters, wax deposition will become a more severe problem, because the longer distances required to reach the shoreline allow for more heat transfer with the colder surroundings. The magnitude of this problem is already significant; Lasmo (U.K. company) had to abandon a platform at a cost of $100 million due to recurring wax deposition in the pipelines (Singh *et al.*, 2000).

Generally, oil companies use two ways to prevent pipe blockage from wax deposition: mechanical techniques and chemical techniques. Mechanical techniques include pigging and cutting using for removing wax already formed. Chemical methods include paraffin inhibitors, dispersants and solvents using for inhibiting deposit formation (Jennings and Weispfennig, 2006). In order to optimize these techniques, a better understanding of wax deposition must be gained.

The purpose of this work is to investigate the effect of composition on n-alkane deposition. A coldfinger apparatus is used to simulate the deposition of n-alkanes for both monodisperse and polydisperse systems. Proper coldfinger operating conditions and experimental methods are also developed.