CHAPTER I
INTRODUCTION

Foam control in many industrial products and processes is an important task because foaming can limit the rate of these processes and the usability of the products especially in laundry detergents and diswashing liquids (Lange, 1994). In order to avoid the excessive foam, development of antifoams has therefore been a necessity. Usually, antifoams are mixtures of oils and solid particles which form hydrophobic droplets in foaming solutions. These droplets bridge the foam films and rupture them by a dewetting action. Extensive studies have been carried out on designing new surfactants that are good detergents and poor foamers (Clint, 1992; Colin *et al.*, 1997).

Another way to solve the problem is to use the inherent property of nonionic surfactants, which is the cloud point. This phenomenon is due to the decreased hydration of the oxyethylene oxygen in the polyoxyethylene hydrophilic group with increasing temperature. As the temperature increases, micelle growth and increased intermicellar attraction cause the formation of particles that are so large that the solution becomes visibly turbid (Shen, 1997). It is well known that the foamability of nonionic solutions is reduced above the cloud point (Colin *et al.*, 1997, Bonfillon-Colin and Langevin, 1997). This property is used in the design of the so-called 'cloud point antifoams', which now have a wide commercial availability. A possible explanation for the antifoaming above the cloud point could be an 'extraction effect'. At the cloud point large amounts of surfactant separate into a new phase, which may cause a depletion of surfactant from the surfaces and therefore a reduction in foam stability. This would be similar to an extraction equilibrium where the insoluble phase extracts any substance from a solution (Nemeth *et al.*, 1998).

Mixed ionic-nonionic surfactants are also of considerable application and fundamental interests. They can be employed over a wider range of temperature, salinity, and hardness conditions than individual detergents. The addition of a minute amount of an anionic surfactant to a nonionic surfactant can increase the cloud point remarkably (Valaulikar and Manohar, 1985; Scamehorn, 1986; Marszall, 1988; Aveyard *et al.*, 1990; Sadaghiania and Khan, 1991). To explain this phenomenon, various mechanisms have been suggested including formation of mixed micelles, solubilization, or complex formation (Rathman and Scamehorn, 1984, 1986). The incorporation of ionic surfactant into the nonionic micelles introduces electrostatic repulsion between the micelles, thus hindering the coacervate phase formation and raising the cloud point. Since most surfactants used in practical applications are mixtures. Where washing situations are concerned, foam has a great psychological effect, although it does not necessarily imply a direct relationship with detergency performance. Generally, many in situ cleaner formulations use combinations of both anionic and nonionic surfactants. Thus understand factors affect and the parameters on which it depends are of interest as far as foaming properties are concerned. The aim of this work is to present an explanation concerning effect of the cloud point on foaming properties of nonionic/anionic combinations with and without added NaCl.