

# CHAPTER I

## INTRODUCTION



Surfactants adsorbed at the solid/liquid interface can form aggregates that are much like micelles. These admicelles solubilize organic molecules in a manner similar to micelles. This phenomenon, called adsolubilization, has not been studied extensively and the first new technologies based on it are just beginning to emerge.

Adsolubilization is the surface analogue of solubilization, with aggregates of adsorbed surfactant playing the role of micelles. While the phenomenon of solubilization has been extensively studied for the better part of this century and has important applications in numerous technologies, adsolubilization is hardly recognized as an important phenomenon at all. Most studies of adsolubilization have occurred since the mid-eighties, and the technological utilization of the phenomenon is only beginning.

Admicellar catalysis is a potential application of adsolubilization which eliminates the most serious drawbacks of both micellar catalysis and phase transfer catalysis, and is also a natural extension of the previous studies on micellar catalysis. Solid surface properties, the interrelationship of surfactants with the solid surface, and diffusion of reactants in pores are all important for application of admicellar catalysis.

This study is a first examination of the effects of pore size and pore size distribution, particle size, and surface properties on the extent and rate

of the adsolubilization of phenol in SDS aggregates adsorbed on porous alumina at fixed temperature and solution pH.

An adsolubilization kinetics "transfer point" was identified in the experimental results. Adsolubilization is fast before reaching that point, but is slower thereafter, probably due to hindered diffusion. In this paper we present these results and discuss their relationship to the abovementioned alumina properties. Understanding the diffusion/adsolubilization process is necessary for choosing the proper solid properties and pore size/pore size distribution to enhance the reaction efficiency in admicellar catalysis.