CHAPTER I

INTRODUCTION

1.1 General introduction on desulphurization of flue gas

The emission of sulphur dioxide from fossil-fuel combustion and other industrial sources represents a serious threat to the environment. Sulphur dioxide is converted by atmospheric processes to sulphates which interfere with normal breathing patterns, reduce visibility, and contribute to the formation of acid rain. The largest single source of sulphur dioxide is coal combustion. Copper smelters and petroleum refineries are perhaps two major noncombustion sources of sulphur dioxide. As we increasingly turn to coal as the primary fuel, we will have to confront the situation that most of the sulphur dioxide emitted in India will originate from fuel combustion in electric-power generating stations, a rapid growth of which is expected during 1980s. Although electric power will also be generated by nuclear method, overall power production is expected to increase so much by the turn of this century that the total usage of fossil fuels will increase. Hence severity of sulphur dioxide problem will continue to grow, unless remedial measures are taken to reduce its emission to a tolerable limit.

It, however, appears that one will have to rely in the near future, mainly on waste gas clean-up processes for controlling SO_2 emission, since production of sulphur-free fuel will require major development in technology. Conventional

technique of using tall stacks with no treatment of the stack gas at power stations and other industrial installations may improve air quality locally, by dispersing the air pollutants, but is likely to aggravate the conditions in remote areas. In fact, there is increasing concern over the total amount of SO_2 emitted and the resulting general increase in ambient concentration over wide areas. Stack gas cleaning to remove SO_2 is, therefore, likely to become a major technology over the next few decades for the reduction of SO_2 emission.

Among the various methods for the removal of SO_2 arising from fossil-fuel combustion, dry control processes have received considerable attention in recent years due to certain specific advantages over the other techniques. In fact, dry SO_2 control system has received considerable attention as one of the most preferred techniques for flue gas cleaning on the grounds of techno-economic aspects. Dry control system typically removes 70 percent of SO_2 in a waste gas stream. It is 15 to 30 percent cheaper to install and operate than a conventional wet scrubbing system. Dry systems usually have savings in reheating and pumping requirements, resulting in 3 to 5 percent energy savings based on plant operation [1]. Such systems would be advantageous in situations where the dust removal should simultaneously remove also oxides of sulphur that is found in coal-burning power stations and ore smelters. In addition, dry SO_2 control system can be advantageously annexed to an existing plant equipped with dry dust collection equipment.