CHAPTER I

INTRODUCTION

Environmental quality is certainly a worldwide concern. Air pollution knows no boundaries, and reducing it is of the utmost importance. Countries are now establishing environmental regulations that must be met by mobile as well as stationary pollution sources. Exhausts containing volatile organic compounds, carbon monoxide, nitric oxides, ozone, and so forth all can be converted to harmless nonpollutants at reasonable temperature and with cost-effective system utilizing heterogeneous catalysts [1].

One support material that has come into substantial prominence, particularly since the introduction of the catalyst used in automotive exhaust systems, is the "honeycomb" also called "monolith", manufactured by many different procedures and by several different companies. It usually has a composition comprising largely refractory materials, permitting the operation at temperatures in excess of 1000°C, which may occasionally be encountered in automotive exhaust handling. Because the honeycomb structures must be catalytically coated, the size of the opening is restricted to a size that can be impregnated and not be blocked by the residual catalytic material. The upper size is generally stipulated by the need for low pressure drop, but here again there is a need for compromise to obtain the adequate catalytic surface while not exceeding the permissible pressure drop and not introducing problems related to the impregnation and coating of the honeycomb [2].

Although, the methods of coating washcoat slurry on honeycomb has been revealed, detailed coating description and quality control procedure were rarely appeared. Hence, one of the purposes of this study is to find some possible parameters that involve in washcoat deposition. Therefore, this research was initiated to study some factors that might affect physical properties of washcoat. The factors investigated in the present research are:

- types of acid
- pretreatment time
- concentration of γ-Al_2O_3 in washcoat slurry
- numbers of dipping
- calcination temperature and calcination time

Thermalshock resistance and abrasive strength are the physical properties selected as indices for qualitative and quatitative measurement of effects of the above mentioned factors in this research.

The present work is arranged in the following sequence:

Chapter II and III give information on honeycomb support and washcoating techniques, respectively. Experimental system and experimental procedures are described in detail in chapter IV.

Chapter V reports all experimental results.

Chapter VI is conclusions and recommendations for future which emerged from this research.

Operating condition and results of Hg intrusion, as well as chemical and physical properties of γ-Al_2O_3 used in this research are collected in Appendix.