ADVANCES IN MATERIALS ENGINEERING

Volume 2

Edited By:
Md Abdul Maleque
Iskandar Idris Yaacob
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SELANGOR DARUL EHSAN
TEL: +603-6188 1542 / 44 / 45 FAX: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

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Chapter 026

Study on Metal Removing from Alumina Ceramics

Agus Geter Edy Sutjipto and Muhyiddin Bin Budah@Udah
Kulliyyah of Engineering – International Islamic University Malaysia
✉ : agus@iium.edu.my

Keywords: Alumina, Catalytic converter, Platinum.

Abstract. The main objective of this chapter is to study on removal rate of platinum (Pt) coating on aluminium oxide (Al_2O_3) substrate by immersing it into an alternative solution of $HCl.H_2O_2.H_2O$ instead of using $HCl.HNO_3.H_2O$. Thus, the objective of the following has to be achieved which is to find the optimum temperature of removing platinum coating on ceramic substrate.

Introduction

Catalytic converter contains platinum group metal (PGMs) that function as a catalyst in producing less toxic gasses from engine combustion gasses. The platinum causes or accelerates a chemical reaction without itself being affected. The platinum participates in the reaction, but is neither reactants nor products of the reaction. It will still remain in the catalytic converter after the reaction takes place. Even after several years of usage, the platinum content will still remain. This platinum will be such a waste, if the catalytic converter is being disposed as a scrap.

The idea behind this chapter came from the possibility of dissolving the Platinum in strong acid. By referring to the reactivity series, platinum will be dissolved in strong acid for example in aqua regia. In this research, nitric acid is replaced which is used in aqua regia with hydrogen peroxide. The advantage about this replacement is to minimize the toxic gas that is produced during the reaction.

The research was done to which about the important trend in the metals market about a coming rise in demand for platinum group metals or PGMs a group including platinum, rhodium, and palladium. These metals were becoming increasingly vital components in a variety of industries, ranging from the high technology and electronics industry to the automotive industry, where both platinum and palladium were necessary materials used in catalytic converter systems, and to the jewellery related industries.

Experimental Procedure

Catalytic Converter

In this project, catalytic converter from Perodua Kelisa car was used throughout the study. The scrap is bought from A&T Advance Sdn Bhd located in Kajang. It has been used for about 7 years.