UNIVERSITI TEKNOLOGI MARA

LITERATURE REVIEW ON THE VARIOUS CHEMICAL COMPOSITION OF AUTO-CATALYTIC NICKEL PLATING

NUR ASYKIN BINTI ZAINUDDIN

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ABSTRACT

Nowadays there are many techniques in preventing corrosion, one of it is electroless nickel plating, this techniques possess several characteristics not shared by other techniques causing it to raise its popularity. Innovative and less expensive substrate materials have found applications when used in conjunction with electroless nickel coatings and the method had improved the reliability of the performance of construction materials. In search for solution to reduce the cost of storage, manufacture and transportation of chemical products has resulted in increased demand for electroless nickel plating. Autocatalytic nickel plating is a chemical technique used to deposit a layer of nickel on an object or workpiece without the use of electric current or an external electrodes. It involves the presence of a chemical reducing agent. This reducing agent will reduce the nickel ions, Ni^{2+}, to nickel metal, Ni. The recorded components of a nickel plating solution are a source of nickel ions, reducing agent, suitable complexing agent, accelerators, stabilizers or inhibitor. The other parameter of the bath such as pressure, temperature and plating rate are also considered. This study will also superficially include about the uses of electroless nickel plating in industries, the procedures of electroless nickel plating from the pre-treatment until the ultimate finishing process and the different of catalytic plating with autocatalytic nickel plating. This study is done by collecting data for these components in the bath solution from literatures available such as books, journals, reports, websites, patents and manufacturing companies.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Most metal are extracted from its ore, because of this the fundamental tendency of nature is abruptly reversed. For example, iron if unprotected by coating, will corrode in most environment. Corrosion prevention had been an essential factor in the economic utilisation of steel. Choosing the right protective coating technique can benefits designers, specifier, material engineers, consultant and fabricators to protect and improve their steel products (Eade, 1995).

In present days, there are many corrosion prevention techniques had been established such as catalytic and autocatalytic plating, galvanizing, painting, polymer coating, cladding and chemical additives and electrochemical method such as cathodic protection. This research is focus on one type of corrosion prevention technique available and in ever-growing popularity, autocatalytic plating, which is focus on nickel deposition on metal. This research is conducted to prepare a complete review on the various compositions of auto catalytic nickel plating.

This corrosion prevention techniques also call as metal finishing technique as it gives finishing of metal and non-metal in which a metallic coating is formed from an aqueous solution or a molten salt by means of an electrochemical reaction. Nickel as a coating are the most widely chosen due to its high corrosion resistance and the attractive finished appearance of metal. The metallizing of plastic using nickel also gives the material a metallic appearance, a higher reflectivity and a low weight deposition. In electroforming, nickel are used because of it higher hardness, wear and corrosion resistance (Kanani, 2004).

Autocatalytic plating, also known as electroless plating, involves a chemical reducing agent in the bath solution to reduce the metallic ions to the metal state instead of using an electric current so instead of using an anode, the metal is supplied by the metal salt and instead of a cathode to reduce the metal, a substrate is used while the electrons is supplied by the reducing agent. This process only occur on the catalytic surfaces but if the process is not controlled properly, the reduction process