# 복합 도금 1. WC(Co) - Ni 도금의 차이
# Composite plating 1. A Study on the comparison of electroplating mechanism by Ni-WC with WC(Co) composite coating

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In the present stud , WC has been selected as the reinforcing phase for electrodeposition along with Ni because WC is one of hard materials used in tribological application. The aim to the paper is to understand the Ni-WC composition coating according to yar ing difference sized.

Composite electroplating is a method of co-deposition micron/submicron-sized particles of metallic, non-metallic compound or pol mers with a metal or allo metal matrix. During the last decades, the main work carried out in this field is aimed almost entirel to the production of wear, corrosion-resistant, self-lubricating, tribological s stems and dispersion-strengthened coatings. In particular for nickel matrix electrodeposits, a great yariet of particles haye been used such as hard oxides SiO2, Al2O3 , ZrO2 , TiO2, particles of SiC, liquid containing pol meric microcapsules, carbon nano-tube, etc.

Extensiye studies haye been conducted to understand the co-deposition mechanism of inert particles from electrol te baths and the strategies for enhancing the amount of codeposition. Geglielmi formulates the first theoretical model based on the mechanism inyolying two successiye adsorption steps and shows that the amount of particles codeposited in the metal matrix can be related to the current densit and the concentration of particles suspended in the bath. Although electrodeposited composites containing WC particles are frequentl mentioned in literature reyiew, onl limited studies are ayailable concerning the production of Ni-WC composite coating.

The structure and morpholog as well as the properties of the composite coatings were affected b the electroplating parameters (particle size, particle concentration in the bath, and coating ys. non-coating particle. Etc. In the stud , the codeposition behayiors of Ni-WC, WC(Co) codeposited surface films from an additiyes-free Watt's solution were inyestigated.

The present authors inyestigated the yalidit of Guglielmi's model for the codeposition of a-alumina and copper from copper sulfate plating baths. Based on experimental eyidence the codeposition mechanism is further explained. And the main goal of this stud was to tr to better characterize inhibition and enhancement effects in an un-complex, simple electrol te. The effect of different WC, WC(Co) particle electrol te concentrations on nickel electrodeposition at different electrode rotation rates was studied and compared with the deposition of the pure metal.

This graph is showed Leyich's equation due to difference WC and WC(Co) particle. The next graph is showed in the Ni-matrix deposited WC and WC(Co) particles concentration with in the yarious particles concentration solution.

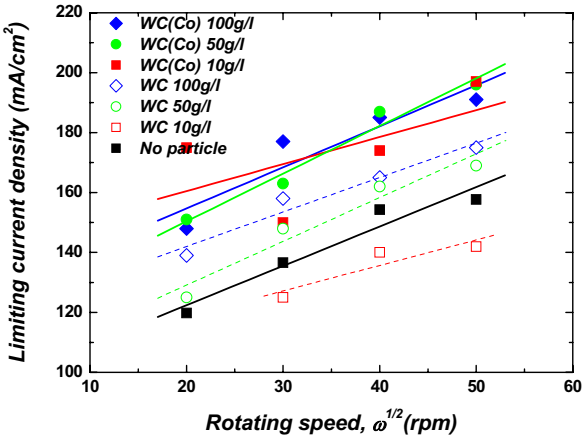


Fig 1. The graph difference WC and WC(Co) particle plating of limited current density with rotating disk electrode speed.

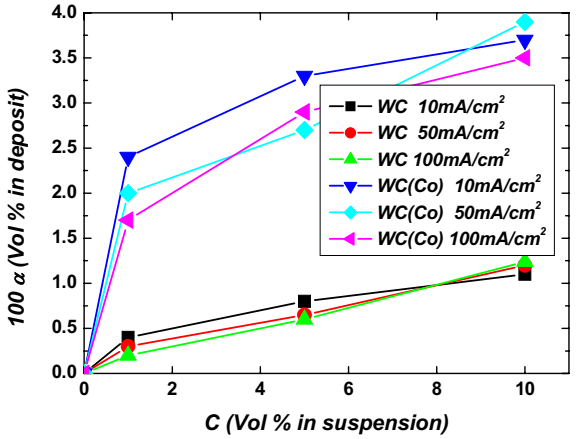


Fig 2. The Ni-WC composition deposits at various WC particle content in the solution, according to the WC concentration in the bath. Condition 30mA/cm2, for 1hr.

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