Preparation of NiP-WC Composite Coatings by Ultrasonically Assisted Electroless Plating and Their Characterization

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To improve coating properties, NiP-WC and NiP coatings have been prepared by ultrasonically assisted electroless plating and their performance after heat treatment has been studied. The surface micromorphologies of the coatings were analyzed, and it was shown that the size of the spherical microstructure of the ultrasonically assisted electroless NiP coating was reduced from 5 ~ 10 μ m to 2 ~ 5 μ m. In addition, pure NiP and NiP-WC coatings with ultrasonic assistance showed 36% and 75% higher hardness than those without ultrasonic assistance and the hardness of the electroless coating after heat treatment was higher than that of the original electroless plating coating. The corrosion resistance of the NiP-WC and NiP electroless plating with ultrasonic assistance showed 18.46% and 52.12% higher R_p value than those without ultrasonic assistance. The results show that ultrasonic assistance can increase the uniformity, hardness, and corrosion resistance of the coating.

Keyword: NiP-WC composite coating; Ultrasonically assisted electroless plating; Heat treatment; Hardness; Corrosion behavior

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