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## Application and practice of WC cermet sprayed composite coating technology in the hot-dip galvanizing line

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With the automotive sheet surface quality requirements continue to increase, for hot-dip galvanizing line roller surface treatment required to improve. We call this direct contact with the strip surface rollers as process roll. Process roll direct contact strip and therefore the performance of the roll surface of the important factors to ensure product quality. Therefore, we hope roll surface coating must have the performance are: Good wear resistence; surface roughness retention; anti-slip; anti-adhesion foreign objects; anti-adhesive zinc powder. In the early 1980s, the general use of the chrome plated rollers, improve the wear resistance and anti-adhesion of foreign matter. But the surface hardness is usually HV300-600, thus poor wear resistance of the roll surface, the use of a certain time, the roll surface roughness is quickly decreased. In recent years, thermal spray technology as an alternative means of chrome plating process has been effective depth research and extensive application. WC cermet coating roller surface, while having a good wear resistance, but the zinc dross and other foreign matter adhering to the surface of the roller is easy, an accumulation of these particles in the coating layer at the bottom of the roughness pitsroll surface roughness would drop dramatically, also zinc slag particles adhere to the surface of the roller can cause tiny scratches on strip surface. We used a composite thermal spray surface treatment technology on rolls made improvements.

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## Effect of applied current and deposition time on electrochemically active surface area and microstructure study of Pt nanoparticles on carbon supports

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In this work, a study of the effect of applied current and deposition time on electrochemically active surface area (ESA) of Pt particles deposited on rotating disc electrodes coated with Vulcan XC-72R carbon-nafion suspension is reported. The plating bath was the solution of 1 M $H_2SO_4$, 5 mM of chloroplatinic acid ($H_2PtCl_6$). Electrochemical experiments were carried out in a standard three-electrode cell at room temperature. The prepared Vulcan XC-72R electrode was used as the working electrode, a platinum wire and an Ag/AgCl electrode served as the counter electrode and as reference electrode, respectively. The obtained material was studied by cyclic voltammetery and scanning electron microscopy (SEM). The ESA was calculated by measuring the average charge associated with the hydrogen adsorption/ desorption potential region. It was found that the ESA linearly increased with the applied current until it reached an optimum current of ca. 1.4 mA. This can be attributed to the increased growth of Pt deposits or new independent successive Pt nucleation. However, at higher current values, the ESA reached values nearly constant. SEM micrographs revealed that the Pt particles were located only at the surface but not in the pores of the porous Vulcan XC-72R carbon layer. This phenomenon may decrease the efficiency of the electrodeposited Pt as electro-catalyst for low temperature fuel cells. It was found that the ESA is dependent on the applied cathodic current and deposition time. By optimizing these parameters it was obtained improved electrochemically active surface area of Pt particles which can be used in the application of low temperature fuel cells.

### Biography

Weldegebriel Yohannes is a PhD student in Electrochemistry at Southern Federal University, Faculty of Chemistry, Rostov-on-Don, Russia. He received his BSc and MSc degrees in chemistry from Addis Ababa University. He served as Lecturer at Addis Ababa University, Ethiopia.

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