Effect of Deposition Time and Temperature on the Performance of Electroless Ni-P Coatings

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In this study, electroless nickel-phosphorous (Ni-P) coatings were deposited on the copper (Cu) substrate in order to improve the electrolyte resistance of electrode tabs of lithium ion battery. The effects of treatment time and temperature on the surface morphology, composition and corrosion resistance of the deposited copper were investigated by scanning electron microscopy (SEM), energy diffraction spectroscopy (EDS), X-ray photoelectron spectroscopy (XPS), electrochemical impedance spectroscopy (EIS) and electrolyte immersion test. The results show that Ni-P coatings deposited at 75 - 80 °C for more than 10 min have much smoother surfaces, and Ni-P coating deposited at 75 °C for 25min has the best corrosion resistance. All Ni-P coatings have good electrolyte resistance and can endure the electrolyte at 80 °C for at least 48h.

Keywords: lithium ion battery; nickel-plated copper tab; corrosion resistance; electrolyte resistance

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