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Effect of additives on the structure and properties of Nickel Silicon Carbide (Ni-SiC) nano-composite coating

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A series of nickel silicon carbide composite coatings have been prepared on metal matrix by electro co-deposition process and is compared with pure nickel coating. Electro co-deposition is done in nickel sulfamate bath. Operational conditions of bath is investigated and optimized to get good quality composites. The surface morphology, micro hardness, coefficient of friction and corrosion resistance behavior of the resulting nickel silicon carbide composites are characterized by energy dispersive X-ray spectroscopy (EDS), scanning electron microscopy (SEM), X-ray diffraction spectroscopy (XRD), Vickers micro hardness test and potentiostatic polarization. The improved surface morphology obtained with addition of surfactant Cetyl trimethyl ammonium Bromide (CTAB) and grain modifier (saccharine) along with nickel silicon carbide composite as indicated by SEM images. Similarly, the decrease in crystallite size observed as shown by XRD analysis. The incorporation of nano SiC in presence of CTAB and saccharine along with nickel gives superior micro hardness as shown by Vickers micro hardness test. Tribology test shows the lesser coefficient of friction on increasing CTAB and saccharine concentration. Corrosion study shows that corrosion resistance behavior of Ni-SiC composite having CTAB is higher than pure nickel deposit. While the corrosion resistance behavior of nano-composites found to be decreased on addition of saccharine.

Biography

Kailash Hamal has completed his Masters in Chemistry from Tribhuvan University and did dissertation work in collaboration with Global Research Laboratory at Sunmoon University, South Korea. Two research papers on his work have been published in international reputed journal (*Materials letters and IJCPs*) and one in National (*Scientific world*). He has also presented his research work in departmental seminar and in International Symposium on Eco- materials Processing and Design (ISEPD 2015 Nepal). He is also one of the active local organizing members of ISEPD2015 Nepal.

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