



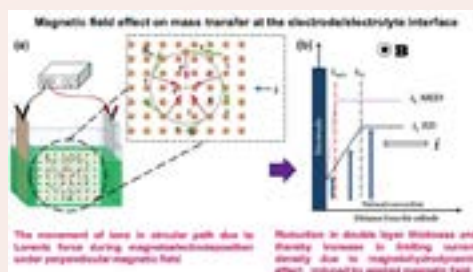
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Effect of induced magnetic field on structure and properties of electrodeposited Ni-W alloy coatings

The effect of induced magnetic field on the process of electrodeposition of Ni-W alloy, and its water electrolysis character has been studied, with respect to its intensity (0.1 T to 0.4 T) and direction (both parallel and perpendicular) of movement of metal ions. The experimental study revealed that electrodeposition under magnetic field, called magneto-electrodeposition (MED) can be used as tool to alter the morphology, crystallinity and composition of the coatings, and thereby to increase its corrosion resistance and electrocatalytic activity for hydrogen evolution reaction (HER). The experimental results demonstrated that both corrosion resistance and HER activity of Ni-W alloy coatings has improved to many folds of its magnitude by MED approach. Drastic improvement in the performance MED coatings were attributed to the difference in process of electrocrystallization taking place under the influence of induced magnetic field, explained by magnetohydrodynamic (MHD) effect arises due to Lorentz force. The corrosion and electrocatalytic behaviors were tested using different electrochemical techniques. The experimental results were supported


by advanced analytical techniques such as Scanning electron microscopy (SEM), Energy dispersive spectroscopy (EDS), and X-ray diffractometry (XRD), and experimental results were discussed with greater emphasis on the changed limiting current density (i_L), affected due to applied magnetic field along with plausible mechanism.



Biography

A Chitharanjan Hegde is a M.Sc. graduate with Ph. D. from Mangalore University in 1993. He served successfully as Head of the Department of Chemistry for three years at NITK, Surathkal (2011-2014), and presently he is a Professor at the same department, and pursuing his research in allied fields of electrochemistry. He has published more than 100 research papers in peer reviewed Journals of National and International repute. He completed many R&D projects, and guided seven Ph.D., 17 B. Tech. and 20 M.Sc. students.

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