ABSTRACT

This work is an application of Business-University-Business Model (BUB). The BUB Model is an alternative methodology for technology transfer and assimilation to industrial clusters. In BUB Model, the university develops a new technology in order to provide a sustainable solution to the problem faced by an industrial cluster. Our work was based on Baruipur Surgical Instruments Cluster situated at Bauipur, West Bengal, India. This cluster is in existence since a long time and has been producing various types of surgical instruments. But, post globalization, this cluster is losing its place in the local as well as international market. Due to lack of technological upgradation, the instruments produced here do not meet the international standards. After visiting the cluster for quite a few times and analyzing the problems, we found that the main problem in the instruments are that they are very prone to corrosion. It has been observed that the instruments start to corrode just after 4-5 autoclaves.

Our main aim was to increase the corrosion resistivity of the instruments. In order to do so, coating the instrument with some protective layer could be an alternative solution. As electroless coating has many advantages and also economically feasible, this method was chosen for our work. Firstly, Ni-P electroless coating was performed and positive results were achieved after heat treatment of the coating. After that, Ni-P-PTFE composite coating was performed over the instruments and highly convincing results were seen after the composite coating.

Electrochemical impedance spectroscopy and potentiodynamic polarization test were performed to measure the corrosion properties. All the corrosion test were performed with blood plasma as the corrosive media. To confirm the presence of the coatings on the substrate, SEM, EDAX, TEM were performed. Also, to check the mechanical characteristics of the coatings, microhardness and nanohardness tests were performed. Furthermore, in order to increase hardness and mass deposition of the coatings, some statistical tools were used for modelling and optimization.

After performing all the tests, it was observed that the corrosion resistivity of the instruments increased to a great extent. So, it can be said that a new technology was successfully developed as a solution to the corrosion problem at Barupur cluster which is both sustainable and economically feasible.