

Autogenous chemical and structural transition and the wettability of electro polymerized PANI surface

Yoganandan Govindaraj^{*1}, Smrutiranjana Parida²

¹Metallurgical Engineering and Materials Science, Mumbai, India

²Indian Institute of Technology-Bombay, Powai, Mumbai, India

Abstract

Polyaniline (PANI) was electrochemically deposited on mild steel substrate. Autogenous transition in physical and chemical structure in nanometer scale showed anomalous behaviour in the wettability of the surface. Surface morphology showed the formation of nano dendritic structure on naturally aged PANI coated surface. Spontaneous changes in the backbone of the polymer was also observed due to oxidation. Electrochemical impedance spectroscopy results exhibited a continuous increase in resistance of the PANI layer due to self-oxidation. Surface topography of naturally aged PANI surface was more smooth and homogeneous as compared to that of as prepared condition. Water contact angle measurement using different liquids showed the surface energy of PANI has decreased >70% after 30 days of exposure in the ambient environment. A gradual increase in water contact angle of >150° on electro polymerized PANI surface was observed over the period indicated superhydrophobic surface. A self-assembled one layer formation was explained with the help of SEM, FT-IR, Raman, XPS and contact angle measurements. The findings are explained based on the Cassie-Baxter mechanism of micro-nano-cluster formation over PANI surface during continuous exposure.



Biography:

Yoganandan Govindaraj has completed his PhD from National Institute of Technology-Calicut in year 2017 and currently doing post doctoral programme in Indian Institute of Technology-Bombay. He has about 11 papers in reputed journals and a patent (PCT) filed in US and EPO as credit for his research interest. His research interest includes electrochemistry, materials chemistry, surface modification for metals and non metals, Corrosion etc.

[26th International Conference on Advanced Materials, Nanotechnology and Engineering](#) June 22-23, 2020.

Abstract Citation:

Yoganandan Govindaraj Autogenous chemical and structural transition and the wettability of electro polymerized PANI surface 2020, 26th International Conference on Advanced Materials, Nanotechnology and Engineering June 22-23, 2020

<https://advancedmaterials.conferenceseries.com/speaker/2020/mr-yoganandan-govindaraj-yoganandan-govindaraj-has-completed-his-phd-from-national-institute-of-technology-calicut-in-year-2017-and-currently-doing-post-doctoral-programme-in-indian-institute-of-technology-bombay>