

Vegetable oil based Nanocomposite for Protective Coatings

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Abstract—Vegetable oil based nanocomposite coatings were prepared via “Green Chemistry” approach with Linseed oil based polyol and nano metal oxide as modifier. The material was characterized by FTIR, TEM and TGA studies. Coating properties were investigated by physico-mechanical tests (scratch resistance, impact resistance, bend tests) and electrochemical corrosion studies by potentiodynamic polarization (PDP) in corrosive media. Salt spray test was performed in salt mist chamber under 5wt% NaCl solution at 90% humidity to analyse the changes brought about by exposure to salt fog environment. The obtained coatings were well-adherent, scratch resistant, impact resistant, flexibility retentive and thermally stable. The results reveal that these coatings serve as promising candidates towards environment friendly corrosion protective coatings. The approach provides “greener solution” to gigantic problem of corrosion, adding additional value to naturally available resources such as plant oils.

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References

- [1] E. Sharmin, O. Rehman, D. Akram, F. Zafar and S. Ahmad. RSC Advances, 2015, 5, 47928-47944
- [2] S.Pathan, S. Ahmad, J Mater Chem A 2013, 1, 14227-14238