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Novel class of polystyrene waste modified urea formaldehyde resin for emulsion paint formulation

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Urea formaldehyde that is trimethylol urea (TMU) resin was synthesized and blended with polystyrene waste (PS) to develop (TMU/PS) copolymer binder for emulsion paint formulation. The resulting copolymer was analyzed for formaldehyde emission. The level of formaldehyde emission was found to decrease with increase in PS concentration and the formaldehyde emission level, in the experiment after blending were within the acceptable levels required in the coating industry in terms of environmental safety. Thus, this class of resin may introduce a novel paint binder in the coating industry. This creates initiatives for new opportunities towards developing various target paint products for different field of engineering, Thus, providing a simple economic route for the recycling of waste polystyrene and hence an important practice for sustainable recycling. The emulsion paint formulated from both TMU and TMU/PS passed pH, viscosity, flexibility, opacity, gloss and storage stability test. Paint from pure TMU failed adhesion, hardness, tackiness, resistance to blistering and drying time test while the TMU/PS paint recorded a pass in all the tests. Both the paints were unaffected by the salt medium but surface defect were observed in the case of TMU films in alkali and acid solutions. TMU/PS films were unaffected by both the acid and alkali solution. This study provides a potential route for both VOC reduction in coating surfaces and environmental pollution from waste polystyrene disposal.

Biography

Dimas Blessed Jen from Nigeria has completed a Master's degree in Industrial Chemistry from ModibboAdama University of Technology, Yola. He is an academic staff with the Department of Science Education, Taraba State University, Jalingo, Nigeria. He has carried out research work on volatile organic compound reduction in paint formulation, utilizing low emission urea formaldehyde. He has five publications in international journals.

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