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Anti-corrosion coatings based on epoxidized vegetable oil and lignin

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Abstract

The objective of this research is to obtain new composite materials based on epoxidized vegetable oil and lignin derivatives by crosslinking them in varying proportions, under specific reaction conditions, as potential anticorrosion coatings. Highly unsaturated vegetable oils as those extracted from Lallemantia iberica or linseed are important raw materials for various organic compounds via epoxidation. Lallemantia oil (LALO) have several special properties due to its high content of alpha-linolenic acid (a triple unsaturated acid), the iodine number (185 to 205) higher than that of linseed oil (170 to 190). Conversion of the unsaturated vegetable oils in more reactive epoxides, represents an important intermediary step to produce polymeric and composite materials suitable for different applications. Due to the special reactivity of the oxirane rings, epoxidized vegetable oils have a valuable potential for obtaining compounds of various classes (polyols, polyamines), but also for polymeric materials (polymerization or polycondensation products).

The major problem related to the anti-corrosion coatings consists in the low resistance to water vapor diffusion; the water penetrates the interface between the metal and the protective layer, thus reducing the adhesion of the coating. The current research study aims to obtain super-hydrophobic polymeric composites using vegetable oil and lignin derivatives. Beside this, using lignin as filler for epoxidized vegetable oils-derived systems could improve general material performances as mechanical strength and thermal stability. The optimization of the synthesis pathway to produce epoxidized vegetable oil, characterization of the obtained compounds, as well as the materials performances will be presented.

Biography:

Raluca Komartin is a PhD student at University POLITEHNICA of Bucharest, Faculty of Applied Chemistry and Materials Science, with in-progress thesis entitled "New anticorrosive coatings based on renewable raw materials". The research domain she is working on is the functionalisation of vegetable oils (epoxidation mainly) and the synthesis of composites materials based on renewable raw materials (vegetable oils, lignin etc.), with improved mechanical strength, thermal stability and other properties, for potential application in different industries.

Speaker Publications:

1. "Capitalizing on Solar Energy in Romania and Improving the Thermal Comfort of Buildings with Solar Air Collectors" Journal of Energy Efficient and Building design
, Pages 75-94
2. "Analysis of Prairie Vole Amylin Reveals the Importance of the N-Terminus and Residue 22 in Amyloidogenicity and Cytotoxicity" Journal of Bio Chemistry
Volume 23, Issue 1, January 2019, Pages 1-6
3. "Amyloidogenicity and cytotoxicity of des-Lys-1 human amylin provides insight into amylin self-assembly and highlights the difficulties of defining amyloidogenicity"; rotein Engineering, Design and Selection, Volume 32, Issue 2, February 2019, Pages 87–93

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