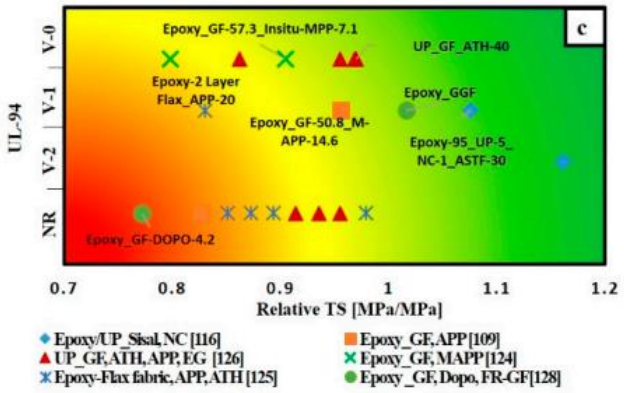
Construction of selection charts for natural fiber polymer composites with flame retardant properties

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Abstract

In the last decades Natural Fiber reinforced Polymer Composite (NFRPC) has been introduced as one of the solutions to overcome the ecological and environmental problems that accompanied the widespread use of polymeric materials in every facet of life. Light weight, low cost and renewability are the key factors behind using Natural Fibers (NF) to reinforce polymers. However, the organic nature for both NF and polymers increases their flammability behavior and this in return limits their application. Flame retardants (FRs) are commonly used to enhance the flame retardancy behavior of polymeric materials. FRs, as any other filler materials affect various properties of polymeric system, namely mechanical, thermal stability, flame retardancy level, thermal conductivity, etc.... In this regard, both flame retardancy and mechanical properties for different flame retardant/polymer systems were evaluated through constructing various selection charts that relate between different measures of flame retardancy and relate these flame retardancy levels with mechanical properties in the aspects of tensile and flexural strength. Moreover, these selection charts were used to select and develop a new FR system for Jute Reinforced Epoxy Composites (JREC) as proof of utility of using these selection charts. The prepared JREC were tested for both mechanical and flame retardancy performance and the obtained results were plotted on the selection chart.

Image



Recent Publications

1. Ramadan, N., Taha, M., La Rosa, A.D. and Elsabbagh, A., 2021. Towards Selection Charts for Epoxy Resin, Unsaturated Polyester Resin and Their Fibre-Fabric Composites with Flame Retardants. Materials, 14(5), p.1181.Heilig M, Egli M (2006) Pharmacological treatment of alcohol dependence: Target symptoms and target mechanisms. Pharmacology and therapeutics 111:855-876.
2. Elsabbagh, A., Attia, T., Ramzy, A., Steuernagel, L. and Ziegmann, G., 2018. Towards selection chart of flame retardants for natural fibre reinforced polypropylene composites. Composites Part B: Engineering, 141, pp.1-8.
3. Elsabbagh, A., Steuernagel, L. and Ring, J., 2017. Natural Fibre/PA6 composites with flame retardance properties: Extrusion and characterisation. Composites Part B: Engineering, 108, pp.325-333.
4. Cicala, G., Tosto, C., Latteri, A., La Rosa, A.D., Blanco, I., Elsabbagh, A., Russo, P. and Ziegmann, G., 2017. Green composites based on blends of polypropylene with liquid wood reinforced with hemp fibers: Thermomechanical properties and the effect of recycling cycles. Materials, 10(9), p.998.
5. Elsabbagh, A., Ramzy, A., Steuernagel, L. and Ziegmann, G., 2019. Models of flow behaviour and fibre distribution of injected moulded polypropylene reinforced with natural fibre composites. Composites Part B: Engineering, 162, pp.198-205.



Biography

Ahmed Elsabbagh is a professor of Materials Engineering in Ain Shams University with over than 25 years in Egypt and German universities. His experience is known in the design, manufacturing and modeling of metallic and polymeric composite systems. He is awarded two international awards. One of them is ICNF2015 for the extrusion of natural fiber engineering plastics with flame retardant properties. On the academic level, research outcomes are well documented with more than 46 peer reviewed publications, participation in four books, 22 oral presentations in international conferences, more than 30 supervised bachelor, master and doctor theses. Besides to 13 funded projects.

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