



The impact of additives on the insulation properties of the epoxy resin building substance

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ABSTRACT

Purpose: Investigation of the possibility of converting a material from outside the scope of thermal insulation (building thermal insulator) to entire it.

Design/methodology/approach: Epoxy resin was used for this purpose, and this was done in two ways. First, the composite thermal insulators were prepared using the weight percent method, where the following additive materials were added to the epoxy (sunflower seed husks, used utensil waste, titanium dioxide powder). The other method, the above-manufactured materials, was used to prepare the composite thermal insulators using the volume ratio method, where the base layer was always epoxy, while the other two layers were among the other materials. The suitability and applicability of the insulator were assessed through the evaluation of its thermal conductivity, specific heat capacity, and hardness tests. All tests were performed under standardized conditions.

Findings: Significant findings were achieved in this study where the thermal conductivity of the epoxy (0.24 to 0.08 W/m.°C) after adding sunflower seed husks based on the weight percent method. Furthermore, when mixing epoxy with utensil waste materials, the specific heat capacity was lowered to 0.31 kJ/kg.K. It is important to note that all of these outcomes are within the methods' defined insulating range. Adding titanium dioxide, and TiO₂ powder was improved the surface hardness of epoxy, where the highest hardness value was obtained after adding this material compared to other additives.

Research limitations/implications: Sustainability and reducing energy consumption are among the most important aspects addressed in this research.

Originality/value: This research aims to study the impact of various additives, namely, Sunflower Seed husks, used utensil waste, and titanium dioxide powder for epoxy resin for obtaining a new material that serves as an efficient insulator inside buildings.

Keywords: Thermal insulator, Sunflower seed husks, Used utensil waste, Titanium dioxide powder

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