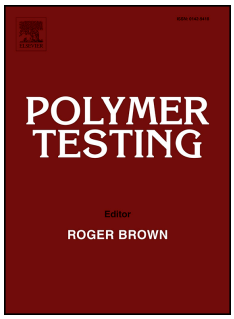

Evaluation of the thermophysical and heating properties of a composite rubber membrane with energy harvesting purposes

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Material Performance

Evaluation of the thermophysical and heating properties of a composite rubber membrane with energy harvesting purposes

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Abstract

This paper evaluates the thermal behaviour of recycled rubber membranes from End of Life Tyres (ELTs) reinforced with steel wool fibres, and their potential use as solar collectors. The thermophysical and heating properties of the rubber membranes with different steel wool fibre contents were evaluated. The thermal performance of a solar collector prototype manufactured with these membranes was also evaluated. It was proven that the addition of metallic fibres can increase the amount of heat absorbed and the heating rate in the membranes. However, fibre addition over 0.5%/v does not contribute to an increase in the temperature reached. A solar collector prototype fabricated with rubber membranes with 0.5%/v of fibres can transmit the heat absorbed by the membrane to the water, reaching a temperature of 45°C, thus demonstrating that it can be used as new sustainable construction material for energy harvesting applications.

Keywords: Rubber membranes; Solar collector prototype; Fibre influence; Thermal performance; Solar radiation.

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