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Enhancing Energy Efficiency through Advanced Polystyrene-Based Waterproofing Agents

Climate change poses significant challenges for building maintenance in regions like the South-Southeast of Mexico, characterized by high humidity and extreme heat. This study introduces a novel approach to address these challenges by developing and testing recycled polystyrene-based waterproofing agents fortified with fiberglass, titanium oxide, and polyurethane. Formulations (M1 to M5) were evaluated for their UV and IR rejection properties using spectrophotometric analysis.

Results indicate that formulation M5 achieves exceptional UV rejection (>99.5%) and significant IR rejection (99.3%). Moreover, simulated tests in irradiation chambers demonstrate that M5 effectively reduces thermal differentials by up to 16 ℃ compared to uncoated surfaces, potentially offering substantial energy savings.

This research contributes to the field by presenting a practical and effective solution to enhance building durability and energy efficiency in humid and hot climates. Further physical testing is recommended to assess adhesion and resistance to environmental degradation, validating the long-term viability of these formulations for widespread application in building materials.

Keywords

energy saving, waterproof coating, recycled polystyrene

Reference

P.W. Collin, J.A. Cassia, A.N. Walsh, J.H. Jackson y C.M. Reddy, Sunlight converts polystyrene to carbon dioxide and dissolved organic carbon, Environ. Sci. Techol. Lett, 6 (11)

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Author approval

I confirm

Author will attend

I confirm

Author: PINTOS DÍAZ, Guillermo Andrés (Universidad Anáhuac Mayab, Instituto Tecnológico Superior Progreso)

Co-authors: ALONZO, Gerardo (Universidad Anahuac Mayab); DOMINGUEZ MALDONADO, RUBÉN (UNIVERSIDAD ANAHUAC MAYAB); Mr MAY DUARTE, Emmanuel (Instituto Tecnológico Superior Progreso)

Presenter: PINTOS DÍAZ, Guillermo Andrés (Universidad Anáhuac Mayab, Instituto Tecnológico Superior Progreso)

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