



Solar Photocatalysis as a Method For Passive Air Purification Using Modified Recycled Rubber Tiles

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Air quality is one of the key factors that determine human health and longevity. The air that we breathe can be contaminated with various impurities such as; sulfur oxides (SO_x), carbon monoxide (CO), ozone (O₃) and the volatile organic compounds (VOCs).¹ The primary idea of this work was to achieve the synergistic action between immobilized photocatalyst titanium dioxide, TiO₂, on the surface of recycled rubber tiles and solar radiation. The synergistic action triggers redox reactions on the photocatalysts surface to degrade various impurities previously mentioned.¹ TiO₂ irradiated with UV light, can decompose many organic compounds to water, carbon dioxide, and mineral acids or their salts.²

Immobilization was validated by SEM-EDS and FTIR analysis. The stability and environmental impact were investigated by leaching test, AAS and TOC analyses. Photocatalytic tests were done in a custom-made wind tunnel reactor with a simulated polluted atmosphere to confirm the activity. Successful immobilization of TiO₂ on the reference rubber tile was achieved, and the photocatalytic activity of the immobilized layer was confirmed by successful degradation of ammonia.

Keywords: titanium dioxide; photocatalysis; recycled rubber; air purification

References

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