

EPsmartcoat: Epoxy Coating based Green Nanofillers

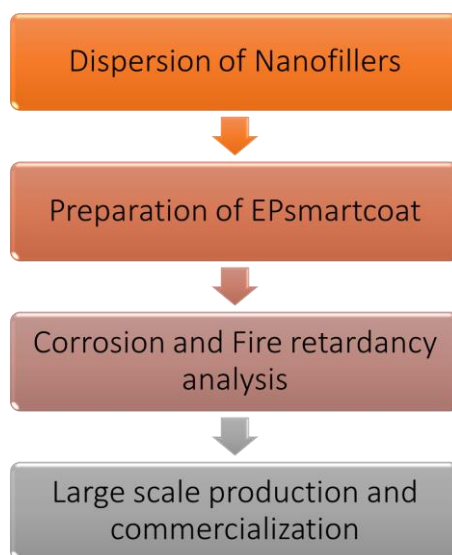
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What is EPsmartcoat?

- Bio-based epoxy coating which suitable for wide ranges applications
- Affordable and excellent aesthetic value of green coating materials
- Benefits of EPsmartcoat: flame retardancy and corrosion-free life (virtual freedom from maintenance and repair)

Methodology



Flame Retardancy

Limiting Oxygen Index (LOI) value of hybrid nanocomposite coatings

Sample	LOI
E0	21.0
EGO0.6H0.2	24.0
EGO0.6H0.3	24.0
EGO0.6H0.4	25.0

Thermal Stability

Thermal degradation temperatures of hybrid nanocomposite coatings

Sample	T ₁₀ (°C) ^a	T _{max} (°C) ^b	Residue at 850 °C (%)
E0	280.8	386.1	4.4
EGO0.6H0.2	287.6	386.5	14.8
EGO0.6H0.4	294.2	391.0	16.3

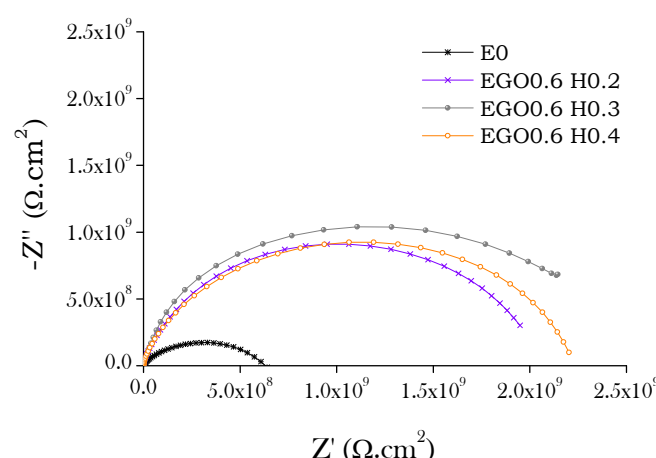
Publications

- **Kabeb S.M.**, Hassan A., Mohamad Z., Sharer Z., Mokhtar M., Ahmad F., 2020, *Synergistic Effect of Graphene Oxide/Halloysite in Anticorrosion Performance and Flame Retardancy Properties of Epoxy Nanocomposite Coating*, Chemical Engineering Transactions, 78, 529-534.
- **Kabeb S.M.**, Hassan A., Mohamad Z., Sharer Z., Mokhtar M., Ahmad F., 2019, *Effect of graphene nanoplatelets on flame retardancy and corrosion resistance of epoxy nanocomposite coating*, Malaysian Journal of Fundamental and Applied Sciences Vol. 15, No. 4 (2019) 543-547

Why EPsmartcoat?

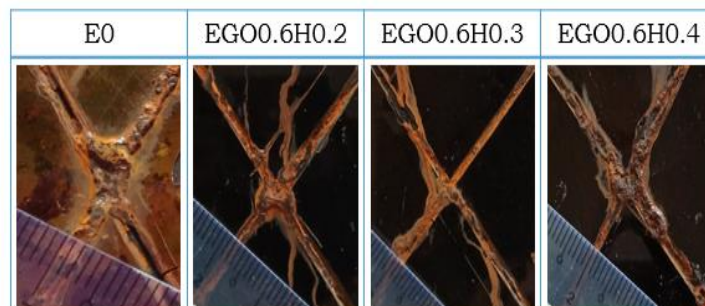
- Durable goods – longest sustainable polymer coatings
- Fire proof polymer coatings
- Eco-friendly- green living coating
- Affordable price

Corrosion Resistant



Electrochemical Impedance Spectroscopy (EIS) of hybrid nanocomposite coatings after 50 days immersion in 5.0 wt. % NaCl solution

Salt Spray Test (SST) of hybrid nanocomposite coatings after 500 hours exposure to 5.0 wt. % NaCl solution



Impedance |Z| value hybrid nanocomposite coatings after 50 days immersion in 5.0 wt. % NaCl solution

Sample	Impedance Z × 10 ⁹ (Ω.cm)
E0	0.642
EGO0.6H0.2	2.048
EGO0.6H0.3	2.490
EGO0.6H0.4	2.227

Environmental Impact

Bio-based nanofillers – eliminating environmental issues

Novelty

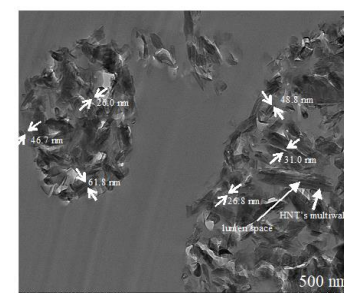
Production of comparable potential green coating material by utilizing HYBRID BIO-BASED NANOFILLERS for fire protection and corrosion prevention.

Adhesion Strength

Adhesion strength of hybrid nanocomposite coatings before and after 200 hours exposure to 5.0 wt. % NaCl solution

Sample	Adhesion strength	
	Before	After
E0	5B	0B
EGO0.6H0.2	5B	5B
EGO0.6H0.3	5B	5B
EGO0.6H0.4	5B	5B

TEM



TEM micrographs of EGO0.6H0.3 coatings

Status of Innovation

TRL 4

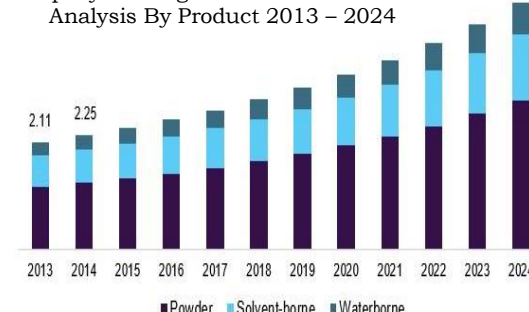
Production costs



US \$6.50 - \$7.50 / Kilogram

Potential Market

Epoxy Coating Market Size & Trend Analysis By Product 2013 - 2024



Source: grandviewresearch