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CERA-COOL : LOW THERMAL CONDUCTIVITY ECO-GLASS COATING MATERIALS

PI No. : PI 2013701444



PROBLEM STATEMENT

- The need of good thermal conductivity materials is important and is needed in multiple thermal applications from a simple application like a cookware material to the more advance power plant. However, to handle this materials at high temperatures is not easy and requires additional equipment or jigs.
- Therefore, Cera-Cool material is designed to have a very low thermal conductivity that makes it suitable for thermal coat application.

OBJECTIVE

- Fabrication of Cera-Cool material with low thermal conductivity glass ceramic from agricultural waste source.
- Cera-Cool properties have high fracture toughness properties utilized from oxide materials (additive) to minimize surface crack

PRODUCT DESCRIPTION

- Cera-Cool material is designed from eco-glass (PI No. : PI 2013701444). The superior characteristic of having an ultra-low thermal conductivity properties makes Cera-Cool a good candidate for thermal coating application. The need of thermal coating materials would have a very significant impact in daily life and works, from a simple application like cookware products to the more advance equipment in power plant.
- To enhance the mechanical properties of glass coating materials, selection of special oxide materials has been conducted that resulted in increasing of fracture toughness (K1c) properties.
- For usage practicality, Cera-Cool has been designed in form of glazing materials so that more tools and equipment can be coated.
- The main material in Cera-Cool is eco-glass, a product from agricultural waste - rice husk. Rice husk has high SiO₂ content that makes the material to have a low thermal conductivity property.

NOVELTY

- In-house eco-glass materials as a main material in Cera-Cool
- Low cost production of Cera-Cool by optimizing eco-glass materials – a glass production from agricultural waste
- Thermal coating material in form of glazing material makes it suitable for many tools and equipment

COMMERCIALIZATION POTENTIAL



Ceramic coating on automotive part



Ceramic coating on piping in power plant

Process



Data / Result

| Materials | Thermal Conductivity W/(m.K) |
|-----------|------------------------------|
| Cera-Cool | <1 |
| Glass | 1 |
| Ceramic | 3-150 |
| Metal | 10 to 400 |



Glazing process for ceramic coating on porcelain materials