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

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 to the more advanced power plant. However, to handle this materials at high temperatures is not easy and requires additional equipment or tools.
- Therefore, Cera-Cool material is designed to have a very low thermal conductivity that makes it suitable for thermal cost 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 (KIC) 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.

COMMERCIALIZATION POTENTIAL
- 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

Data / Result

<table>
<thead>
<tr>
<th>Materials</th>
<th>Thermal Conductivity W/(m.K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cera-Cool</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Glass</td>
<td>1</td>
</tr>
<tr>
<td>Ceramic</td>
<td>3-150</td>
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<tr>
<td>Metal</td>
<td>10 to 400</td>
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</tbody>
</table>

Glazing process for ceramic coating on porcelain materials