SELF-HEALING MATERIAL FOR SPACE APPLICATIONS

Ucon – 046
Feb 26, 2015

Partner institution :

CONCORDIA UNIVERSITY

BACKGROUND

Composite materials used in space application are susceptible to micro-cracking due to stresses and vibrations during launch, extreme temperature fluctuations from -150°C to 150°C and impact of space dusts. These structures are very expensive to produce and deploy. It is, therefore, important to ensure their long operational life. Furthermore, because of their remote locations, it is impractical to repair the structures manually.

To circumvent these problems, self-healing technologies are the solution. Currently such technologies still require some external assistance to activate the self-healing process and are not automated.

TECHNOLOGY

The technology consists of a repair mechanism involving a liquid monomer 5-ethylidene-2-norbornene (5E2N) contained in small capsules distributed in a resin matrix that will react with a catalyst in response to impacts.

Polymerization of the monomer forms a solid structure and bridges the walls of the cracks, healing them, and hence efficiently repairing the damage.

COMPETITIVE ADVANTAGES

- Light-weight, high stiffness and high strength of the epoxy fibers
- A large range of operating temperature from 80°C to 146°C
- Short polymerization time (less than one minute at 40°C), hence faster healing rate
- Uses a monomer which is less toxic than the currently used DCPD (define) monomer
- Significantly increases the stability of the catalyst encapsulation in the monomer (lower catalyst loading of 0.1% (w/w))
- Reduces maintenance costs.

TECHNOLOGY DEVELOPMENTAL STAGE

The technology is currently under experimental research.

APPLICATIONS

Perfect for structures placed in outer space for communication and exploration purposes.

PATENT STATUS

Utility patents for the USA and Canada.

BUSINESS OPPORTUNITY

License available. Looking for strategic partnership in the space field.

For Information please contact:
Duc LeVan
Senior Director, Business Development
T.: 514 840-1226, ext. 3003 / dlevan@aligo.ca