Announcing the Final Examination of Sarah Cox for the degree of Master of Science

Time & Location: July 7, 2014 at 2:00 PM in BA1 212
Title: Processing and Characterization of Continuous Basalt Fiber Reinforced Ceramic Matrix Composites Using Polymer Derived Ceramics

The need for high performance vehicles in the aerospace industry requires materials which can withstand high loads and high temperatures. New developments in launch pads and infrastructure must also be made to handle this intense environment with lightweight, reusable, structural materials. By using more functional materials, better performance can be seen in the launch environment, and launch vehicle designs which have not been previously used can be considered.

The development of high temperature structural composite materials has been very limited due to the high cost of the materials and the processing needed. Polymer matrix composites can be used for temperatures up to 260°C. Ceramics can take much higher temperatures, but they are difficult to produce and form in bulk volumes. Polymer Derived Ceramics (PDCs) begin as a polymer matrix, allowing a shape to be formed and cured and then to be pyrolized in order to obtain a ceramic with the associated thermal and mechanical properties. The use of basalt in structural and high temperature applications has been under development for over 50 years, yet there has been little published research on the incorporation of basalt fibers as a reinforcement in the composites. In this study, continuous basalt fiber reinforced PDCs have been fabricated and tested for the applicability of this composite system as a high temperature structural composite material. The oxyacetylene torch testing and three point bend testing have been performed on test panels and the test results are presented.

Major: Materials Science and Engineering

Educational Career:
Bachelor’s of Aerospace Engineering, BS, 2004, The Georgia Institute of Technology

Committee in Charge:
Jihua Gou, Chair, Mechanical and Aerospace Engineering
Yong-Ho Sohn, Materials Science and Engineering
Jayanta Kapat, Mechanical and Aerospace Engineering

Approved for distribution by Jihua Gou, Committee Chair, on June 16, 2014.

The public is welcome to attend.