Research Title: Process Modeling for Polymer Matrix Composites

Individual Sponsor:
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Academic Area/Field and Education Level
- Ph.D. or Ph.D. candidate Materials, Composites, or Chemical Engineering Discipline

Objectives:
1) Develop a flow model for low melt viscosity, high temperature polymer resins.
2) Define and measure key resin properties (viscosity, pot life etc.) that will be used to develop the flow model.
3) Validate flow model with actual resin injection experiments in a flat panel mold or a more complex part geometry.

Description:
Resin Transfer Molding (RTM) of high performance composites provides a number of advantages such as decreased cost, cycle time and the potential to utilize 3D fiber preforms over traditional hand-layup, autoclave-based, part fabrication. The goal of this research topic is to develop a model using commercial RTM modeling packages that reflects the permeability of state-of-the art high temperature polymer resins with fiber preforms. The research will require the acquisition of key resin properties and engineering parameters suitable to provide a model that can be validated with actual flat panel or more complex mold geometries.

Research Classification/Restrictions:
US Citizens only. The resins that will be used in the program are considered at the least, commerce controlled.

Eligible Research Institutions:
University of Dayton, Ohio State University