

In-situ Bubble Characterization during Resin Infusion

ID: 2018-055

Executive Statement:

A novel method for the visualization and analysis of bubbles in carbon reinforcements during liquid composite molding.

Technology Overview:

This technology introduces a groundbreaking approach to bubble characterization in the resin infusion process of composite materials. By utilizing UV sensitive dye and specific lighting conditions, it overcomes the limitations of traditional methods in observing bubbles within opaque materials like carbon fibers. The process is complemented by an automated image analysis, leveraging software tools such as ImageJ and Matlab, to provide detailed detection and statistical analysis of bubbles, aiming to enhance the overall quality of composite materials.

Key Advantages:

- Enables visualization of bubbles in opaque materials
- Automated image analysis for detailed bubble characterization
- Improves the quality of composite materials by minimizing voids
- Facilitates the development of modeling tools to optimize the resin infusion process

Problems Addressed:

- Difficulty in observing bubbles within carbon fiber reinforcements
- Lack of detailed analysis and statistical data on bubble formation during resin infusion
- Impact of voids on the mechanical performance of composite materials

Market Applications:

- Quality control in the manufacturing of composite materials
- Research and development in liquid composite molding processes
- Enhancement of composite materials used in aerospace, automotive, and marine industries