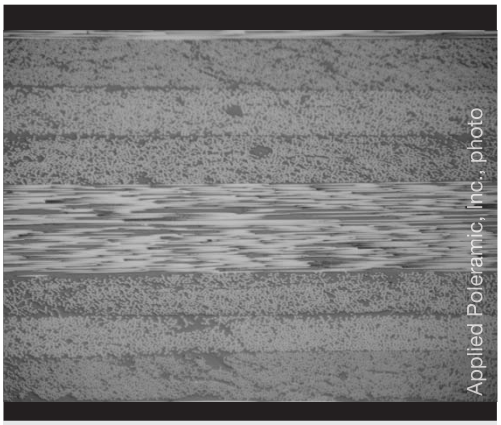
Out-of-Autoclave Cure Composites

Technology provides excellent balance of mechanical properties and damage tolerance

As the size of aerospace composite parts exceeds that of even the largest autoclaves, the development of new out-of-autoclave processes and materials is necessary to ensure quality and performance. Many out-of-autoclave prepreg systems can produce high-quality composites initially; however, due to long layup times, the resin advancement commonly causes high void content and variations in fiber volume.

Applied Poleramic, Inc. (API), developed an aerospace-grade benzoxazine matrix composite prepreg material that offers more than a year out-time at ambient conditions and provides exceptionally low void content when out-of-autoclave cured. When compared with aerospace epoxy prepreg systems, API's innovation offers significant improvements in terms of out-time at ambient temperature and the corresponding tack retention. The carbon fiber composites developed with the optimized matrix technology have significantly better mechanical performance in terms of hot-wet retention and compression when compared with aerospace epoxy matrices. These composites also offer an excellent overall balance of properties. This matrix system imparts very low cure shrinkage, low coefficient of thermal expansion, and low density when compared with most aerospace epoxy prepreg materials.



Applications

NASA

- Launch vehicle structures
- Large composite structures
- Composite cryotanks

Commercial

- Military and commercial aircraft
- High-performance composite applications
- Large structures

Phase II Objectives

- Develop matrices with out-of-autoclave processing characteristics
- Develop carbon fiber unidirectional prepreg systems using the novel matrices
- Demonstrate high-quality, low-void content, single vacuum bag oven-cured composites
- Demonstrate long out-times and insensitivity to the layup environment
- Demonstrate aerospace mechanical performance

Benefits

- Long out-time
- Low sensitivity to layup environment
- High modulus
- Damage tolerant

Firm Contact

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