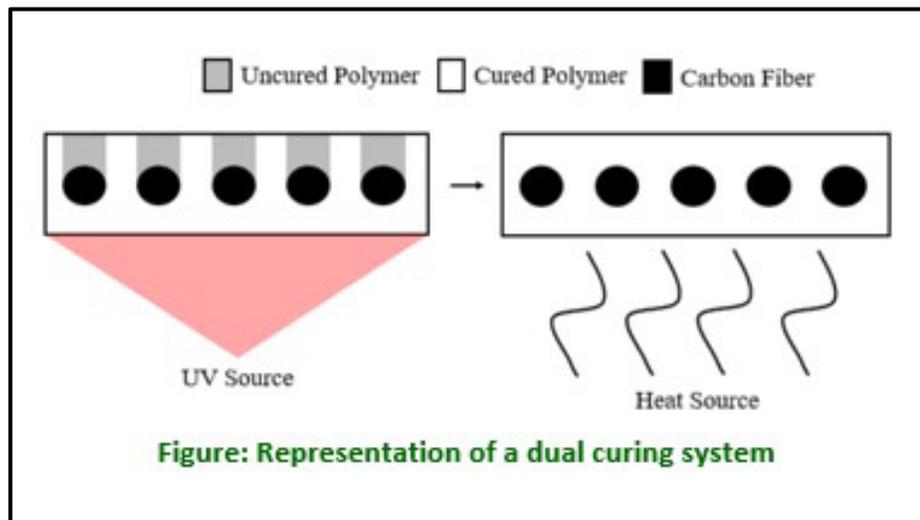


ADDITIVE MANUFACTURING COMPOSITES WITH FLOW INDUCED FIBER ALIGNMENT (RFT-595)

Invention Summary:

3D printing or additive manufacturing is digital modelling and printing one layer at a time, to get a finished product. Stereolithography is one of the commonly used techniques for 3D printing. There are several drawbacks with currently available stereolithography (SLA) resins, prominently with respect to poor mechanical properties. Researchers at NDSU have developed a novel modification of SLA 3D printer to induce fiber alignment in 3D printed products. A special apparatus was constructed and added to the SLA printer to maintain uniform fiber dispersion in each printed part. The modified configuration hosts a dual curing system that assists in uniform fiber dispersion and orientation. Fibers can be aligned layer by layer during curing, reinforcing the resin to produce stronger 3D prints, with improved mechanical properties such as flexibility and tensile strength. The use of reinforced fibers in the resin matrix also allows an improvement in the load bearing and penetrative properties of both the matrix and the fiber, as compared to the ones with any reinforcement.



Benefits:

SLA resins exhibit improved mechanical properties such as:

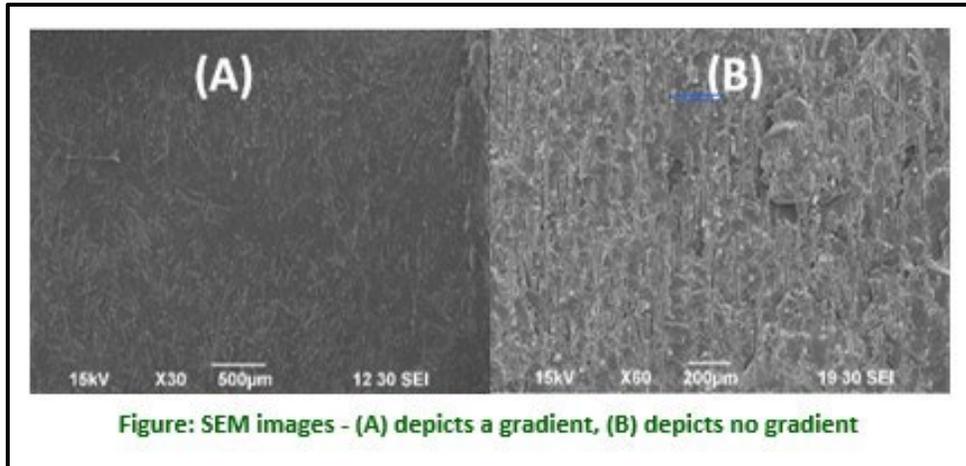
- Locked alignment
- Increased strength;
- High stress tolerance
- Reduced shrinkage allowing maintained dimensional tolerance;
- Compatible with different types of fibers
- Cost effective

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Phase of Development:

This technology has successfully completed laboratory testing with reproducible results.

**Applications:**

This technology is an immediate modification of current industry standard SLA printers. It can in turn be used for small- and large-scale manufacturing of, but not limited to:

- Packaging materials; electronics, food, paper, etc.
- Laminates
- Automotive components
- Household novelty items

Patents:

This technology is [patent pending](#) in the U.S. and is available for licensing/partnering opportunities.

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