



DESTINATION STARTUP

Mallinda, Inc.

One-Sentence Summary of What You Do: Mallinda, Inc. is solving the problem of structural composite waste by enabling end-of-life circularity of composite parts.

Affiliated Institution: University of Colorado Boulder

Have you formed a company yet? Yes

Funding/Financing: Grant Funding, Direct/Indirect University Support, Angel Funding (including Self or Friends/Family), Venture Capital

Please describe your company and the problem you are trying to solve: Vitrimers represent a paradigm shifting new class of synthetic polymers. Similar to thermosets (such as epoxy resins), Vitrimers are highly crosslinked network polymers – preferred for robust mechanical performance. However, unlike traditional thermosets, Vitrimers can be reprocessed after the polymer matrix has cured. The chemical reversibility of covalent network bonding is unlocking both high volume production of thermoset-like parts and more importantly, circular recycling of fully-cured end-of-life materials.

While initially reported in 2014, it has taken until today to develop scalable imine-linked vitrimer resins that are appropriately mechanically robust for structural applications. Mallinda has developed a variety of formulations meeting the thermomechanical requirements of several industrial applications.

Recent industry trends, driven primarily from legislation within the European Union, are heavily focused on sustainable materials for the “Circular Economy”. New products entering the EU markets must be recyclable. Within the last 12 months nearly all of Mallinda’s in-bound commercial interest stems from companies seeking intrinsically recyclable solutions for their application spaces. A brief list of Mallinda’s current relationships that are driven by the value proposition of recyclability: Siemens Gamesa Renewable Energy (recyclable wind blades); BMW M-group (recyclable composite structures for auto); TRB Lightweight structures (recyclable composite structures for auto, rail, and aerospace); Teijin (Recyclable resin for Aramid reinforced composites in transportation and ballistics), Hanwha (Recyclable resins for H2 Pressure vessels). Mallinda maintains a robust patent portfolio for protection.

What is/was your go-to-market strategy? Structural composite materials are primarily made with mechanically robust thermosetting resins. The global thermoset market (TAM) for thermoset resins is \$58B with an overall CAGR of ~6.2%. Further segmenting Mallinda’s SAM, the market for thermosetting resins used in composite applications is \$14B with a strong CAGR of 14.7%.



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Within the SAM, Mallinda's SOM in a variety of segments is as follows: Wind: \$2B, Aerospace: \$2B, Automotive: \$800M, Sporting Goods: \$740M. Increasing demand for lightweight materials to improve EV range, fuel efficiency, and operating efficiency are primary drivers of growth.

As a startup in the materials space, and competing against well-characterized legacy materials, Mallinda's go-to-market strategy has been predicated on entering markets with lower barriers to entry (e.g. Sporting Goods), while developing and qualifying its technology for higher-value markets with longer validation and adoption timelines (e.g. Wind, Automotive, Aerospace).

Mallinda's innovation is not only a platform technology with a broad range of both mechanical and processing capabilities, but it also offers a number of unique value propositions for thermosetting resins that have heretofore been unapproachable by traditional materials. Mallinda's Vitrimax resin platform has been designed as a drop-in for 2-part epoxy systems. Vitrimax can be utilized as a "standard" epoxy resin, in which two parts are mixed, and the resin is cured. However, due to the nature of reversible imine-linked chemistry, and unlike traditional thermosetting resins, the material may be reprocessed; unlocking new functionalities, such as adhesive-free composite welding, reshaping, repair, and thermoplastic-like processing (pre-cured thermoset prepreg compression forming).

How will/do you generate revenue? Mallinda is an upstream B2B specialty chemical supplier of recyclable resins for structural composite applications. Mallinda's customers are primarily OEMs and Tier-1 manufacturers. The company has two broad customer segments internally classified as "Industrial", and "Recreational" these segments have different value propositions, and different manufacturing processes.

Commercial development has centered on paid custom formulation projects with enterprise partners. This approach has been successful for Mallinda's market entry in 2 key ways. First it has provided insight into customer expectations regarding performance; allowing the company to develop 2 classes of products to meet the most generally applicable performance requirements across a wide array of market segments – its Vitrimax T-100 and T-130 product classes. Second, it has resulted in one near-term supplier contract with Bauer Hockey, and JD's with Teijin Aramid, and Siemens Gamesa, and others.

Presently, Mallinda sells direct to its customers; maintaining capital efficiency through the use of toll manufacturers for industrially scaled resin production. The company has successfully scaled its resin production to the metric ton batch size with toll partners Richman Chemical/Isle Chem; and is presently seeking additional toll partners in Asia and Europe for geographic proximity to Mallinda's customers' production centers. Mallinda will enter a North American distribution relationship with IMCD in early 2022 to leverage IMCD for enhanced sales/marketing reach. IMCD is the world's largest distributor of specialty chemicals.



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How will this showcase benefit your company or technology? Mallinda is raising a \$6M series B for commercial scale up. We are seeking both financial and value chain strategic investors. In addition, the company is always seeking development work with strategic partners.

Who are the members of your team and why is this the right team to get the job done?

Mallinda Inc. was founded in April 2014 based upon technology developed by co-founder and CTO, Philip Taynton during his Ph.D. in materials chemistry at the University of Colorado. Chris Kaffer, a co-founder and the CEO of the company, earned his Ph.D. at UC Berkeley and his MBA at CU, Boulder. Chris focused on entrepreneurship and early-stage financing during business school at CU, and has a breadth of operational experience and expertise bringing IP experience and finance experience. Chris leads the company's capitalization and partnership programs. Heather Rubin, Ph.D., the Vice President of Research and Development at Mallinda earned her Ph.D. from Colorado State University (CSU) and directs the technical team. Sanzida Sultana is a Material Engineer at Mallinda with her Ph.D. in Mechanical engineering from Georgia Tech, where she studied the recycling of prepreg trim waste composites. She is developing industrialized recycling processes to enable vitrimer matrix composite recycling at scale.

The company plans to launch commercial products Spring of 2022. Mallinda has scaled the resin to >1 metric ton with Richman Chemical/Isle Chem, and is entering a North American distribution relationship with IMCD (the largest global specialty chemical distributor) in Q1/Q2 2022.