

Private Company [?](#)

Sustainable cross-linkers for enhanced performance

 MATERIALS

Background

In today's market, consumers increasingly expect products that not only perform well but also maintain their effects over time, whether in personal care, household products, or other functional formulations. To meet these demands, manufacturers use various technologies to improve the stability, retention, and controlled release of their active ingredients - compounds essential to enhancing product functionality.

Cross-linked polymers and resins of specific building blocks are widely used to stabilize and retain these active ingredients, protecting them from environmental factors like water, heat, or mechanical stress. This enhances the durability and effectiveness of the product over time. However, conventional cross-linking chemistries often carry environmental and health risks, including toxicity and poor biodegradability. Achieving the right balance between stability (crosslinking strength), sustainability, and biodegradability of the cross-linked polymers and resins is a major challenge.

As crosslinking density increases, the material generally becomes more resistant to breakdown by environmental factors, compromising biodegradability. Finding cross-linkers and building blocks that deliver long-lasting performance without compromising environmental safety or biodegradability is a key research focus in many fields, including bioplastics, coatings, and advanced material formulations.

What we're looking for

We are looking for low-hazardous crosslinking systems that balance performance with biodegradability. Specifically, we are interested in cross-linkers and building blocks that, when combined with synthetic or natural building blocks, enable high crosslinking density while allowing the material to degrade naturally.

Solutions of interest include:

- Enzyme-based crosslinkers
- Modified existing cross-linkers to enhance biodegradability and control reactivity
- Oligosaccharides and polysaccharides that include a cross-linkable moiety
- Other bio-based polymers with adjustable degradation rates

- Researchers capable of developing tailored crosslinking systems
- Synergistic combinations of multiple cross-linkers for improved performance

Our must-have requirements are:

- Controlled crosslinking process with predictable reactivity and manageable kinetics.
- Maintain biodegradability at high crosslinking density.
- Commercial cross-linkers must include their chemical structure in the proposal.
- Proposals should include a brief rationale explaining the potential effectiveness of the cross-linker.

Our nice-to-have's are:

- Perform well under moderate conditions (up to 100°C, 1 - 2 atm pressure).
- Accommodate a range of molecular weights (up to 5kDa).
- Scalable for industrial production (hundreds of metric tons).
- Materials derived from natural, biodegradable, or environmentally friendly sources.
- Researchers with expertise in developing tailored crosslinking solutions.
- Materials with preliminary safety data or assessments available.

What's out of scope:

- Materials that are/may be classified as [substances of very high concern](#).
- Non-degradable solutions (e.g. siloxanes, certain PEG derivatives, acrylates, isocyanates).
- Highly reactive building blocks or cross-linkers prone to uncontrolled polymerization/crosslinking.

Acceptable technology readiness levels (TRL): Levels 3-9

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

What we can offer you

Eligible partnership models:

- Sponsored research
- Gift (Unrestricted grant)

- Co-development
- Supply/purchase
- Material transfer

Benefits:**Gift (Unrestricted grant)**

The level of funding could be in the range of 15000€ to 150000€, depending on the work plan and milestones.

Sponsored Research

The level of funding will be consistent with ranges typical of those for postgraduate or post-doctoral research, and could be between 25000€ to 150000€ depending on the work plan.

Expertise

We are committed to in-house testing of proposed solutions to provide guidance during the project period. As a selected partner, you will therefore have access to industry experts with regular (monthly) meetings to ensure alignment and project success.

Please contact the University of South Florida Technology Transfer office representative for submission - Roisin McNally at rmcnally@usf.edu.