



DEAKIN BIO

Advanced materials, inspired by nature

Developing biocomposite materials as low-carbon alternatives to ceramic tiles

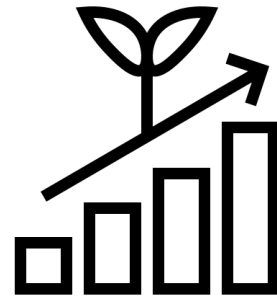
~~Dr Alessia Andrews~~ Dr Aled Roberts

Transforming Foundation Industries Network+ Christmas conference 2023

Overview: we have developed a low-energy, scalable process to produce bio-based alternatives to ceramic materials



Innovative approach & proprietary platform technology



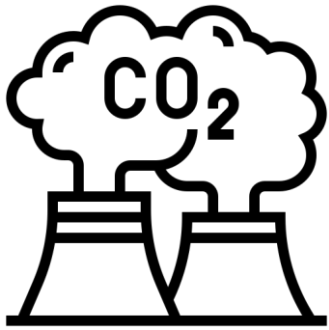
Low-cost, sustainable and scalable process



First use case: sustainable alternative to ceramic tiles

Project aim: to develop and optimise a core material – Cyalith

Problem: the European ceramic tiles sector is facing a crisis



Unsustainable processes



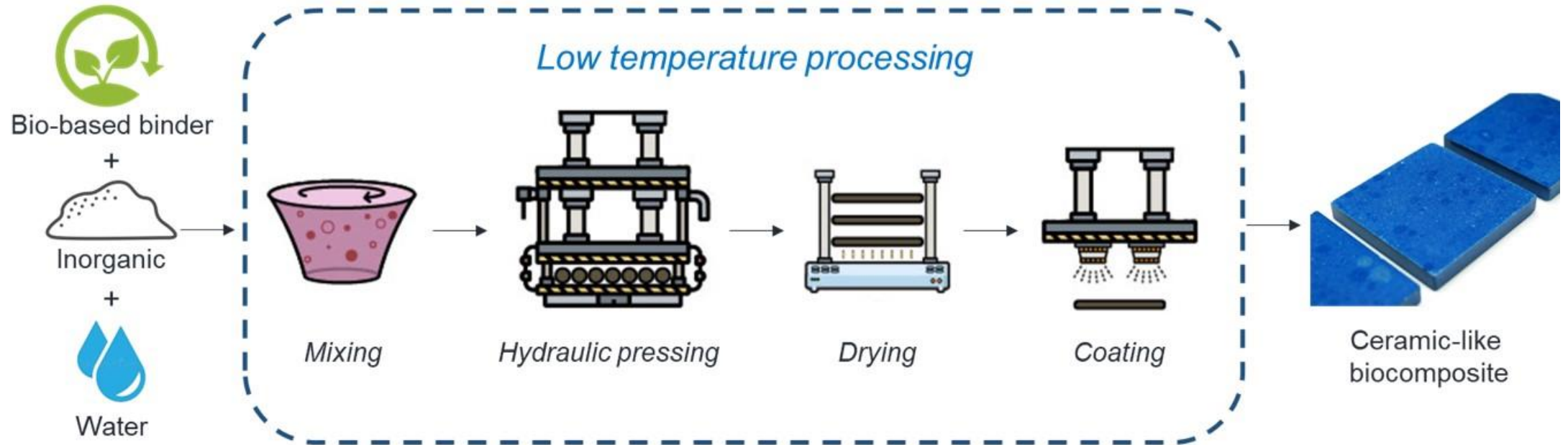
High energy prices



Tightening emissions regulations

Sustainable alternatives are needed for producers and customers

Solution: a process that massively reduces carbon footprint



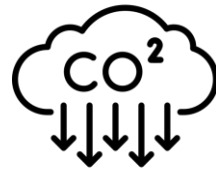
The **BioSintering**[®] process:

a drop-in solution for the hot problem faced by the ceramic sector

First use case: Cyalith



Cyalith tiles



Up to 94% lower
CO₂ footprint



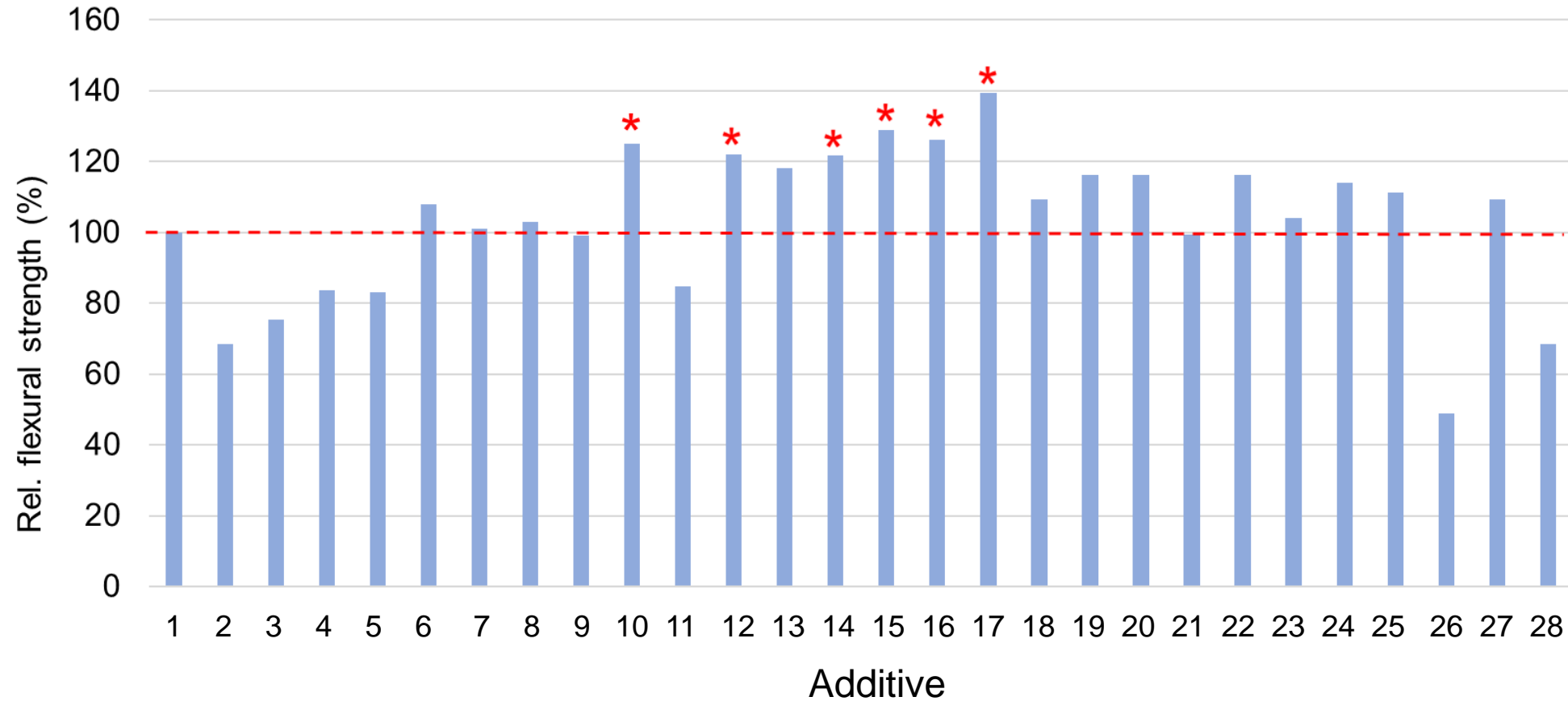
>95% recycled
content



Working towards
active standards
(EN 14411)

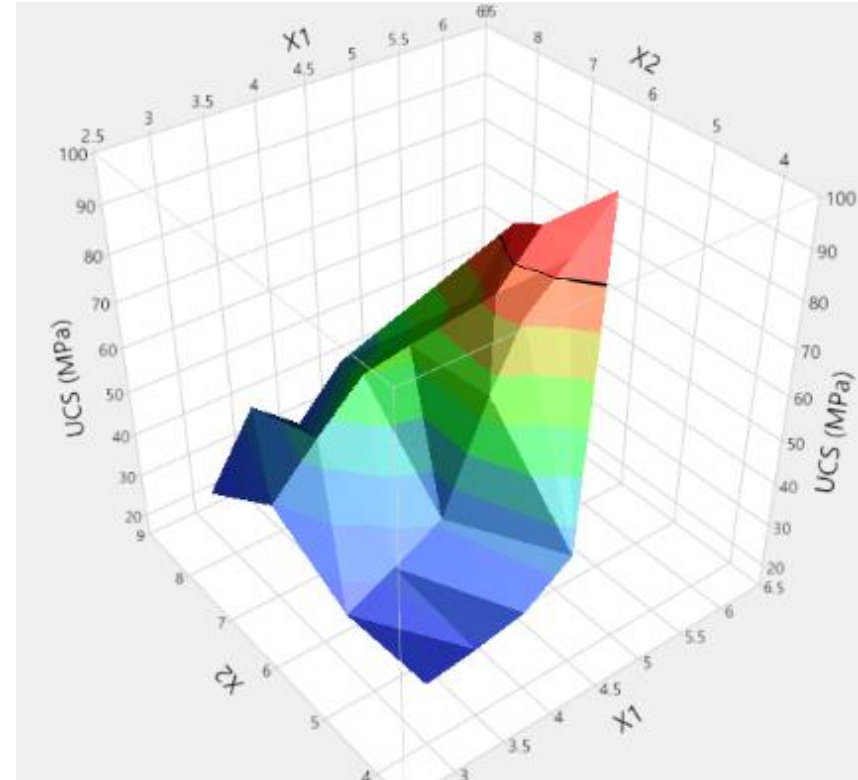
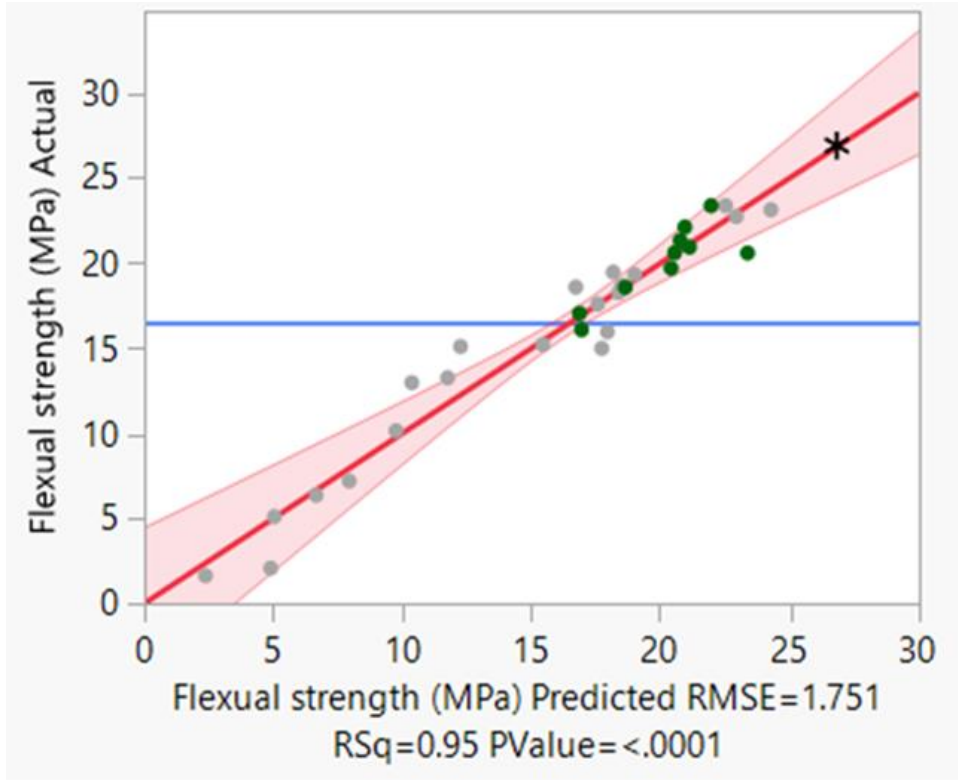
This project: improve the flexural strength of Cyalith from 4 to >12 MPa

Step 1: Additive screening



Step 2: Optimisation through hybrid DoE

Augment human researchers with computational tools



Result: achieved Ultimate Flexural Strengths in excess of **25 MPa**

Competition case study: BioMason Inc.

Feature	Deakin Bio	BioMason
Funding	£0.3m	>\$96m
Development	~2 years, small team, basement	10+ years, large team, professional labs
Flexural strength	Up to 25 MPa	3.5 MPa
Production cost	Low	High
Sale price (m ²)	£40-150	£200
Production time	Fast	Slow
Scalability	Great	Poor

Deakin Bio: better performance, scalability and cost than well-funded competitors

Our business model: low capex and exploiting existing industry assets

1. Technology licencing (royalties on sales):

- Bespoke tile manufacturer, looking to convert existing product lines and address exclusive high end clients
- Enables rapid demonstration of production on existing production lines
- Discussions in progress

2. In-house manufacturing (direct revenue):

- Initial small volume production runs.
- Build market interest with high visibility clients, build product awareness through trade journals, etc.

3. Sub-contract manufacturing (direct revenue):

- Use experience from licensee production to build confidence in volume production
- Enables Deakin to supply larger clients and put agreements in place with national tile distributors

Trident approach: for flexibility & rapid growth

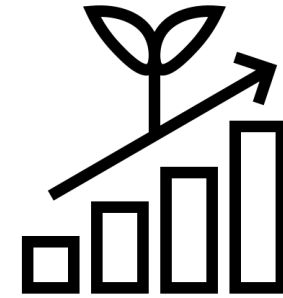
Traction: strong non-dilutive support and growing commercial interest



£270k+ in grants and prizes secured

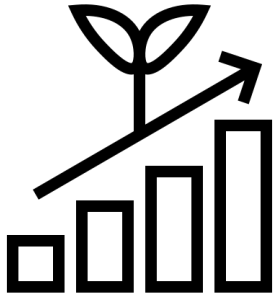


Interest in >4000 sqm.
(estd. £200k revenue)

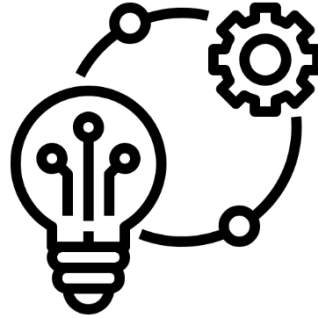


Advanced negotiations with first licensee

Summary: a highly scalable, cost-effective approach to massively reduce the carbon footprint of ceramic production



Breakthrough technology with huge impact potential



Innovative development platform for future use cases



Strong team with proven experience

Project summary:

- Additive screening identified a range of promising additives
- Hybrid DoE optimisation increased KPI by >600%, exceeding target 12 MPa requirement (EN 14411)