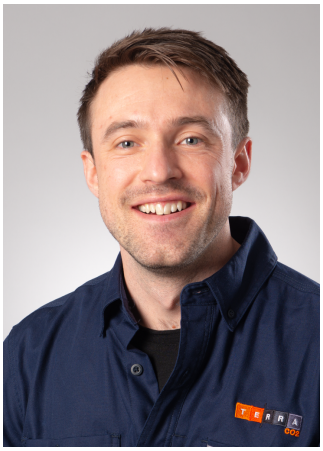
The Future of Cement: OPUS ZERO

DJ Lake, Founder and Chief Science Officer



At Terra CO2, we are on a mission to deliver decarbonized concrete both efficiently and cost-effectively.

Concrete is a wonder material for construction and its only serious problem is that it contains carbon-intensive clinker in the cement. Our solution relies on seamlessly lowering the clinker factor over time at a minimum cost to everyone in the concrete supply chain.

Step one is to reduce cement use in concrete by providing scalable production of our manufactured OPUS SCM™, a fly ash-like synthetic pozzolanic material.

Step two is to completely replace cement with OPUS ZERO™, a new cement built upon proven chemistry, containing zero clinker. OPUS ZERO™ is a manufactured cement that does not rely on the availability of byproducts. It leverages the existing OPUS production process to support more advanced cement chemistry because a scalable supply chain is as much an innovation as our material science.

Concrete is critical to modern construction, its ubiquity surpassed only by its impact on our planet. Terra's approach to decarbonization is not just another alternative; it's a true advance. By focusing on the chemistry of cement, we have literally addressed the carbon footprint from the ground up. It's understandable to feel attached to the legacy cement we all know, but at the same time, why would Portland cement, a product of the past, be the end point of advancing cement technology?

The cement industry is on the cusp of a sustainability transformation, but desperately needs more practical, more efficient and cost-effective technologies to achieve real change. Our innovative take on inorganic polymer chemistry, OPUS ZERO™, is one cornerstone of this transformation. Our low or zero CO_2 OPUS cement isn't simply a marginal improvement; it's a leap forward.

Here are some of the key design principles that went into creating our cement of the future:

Abundance-Based Design: Scalability is built into the chemistry of our product. Our OPUS ZERO™ is formulated around the most abundant silicate-based geological resources on Earth (even more abundant than limestone), ensuring that this is not just a niche solution but a global approach.

Energy Efficiency: We meticulously engineer our processes to minimize energy consumption, strategically eliminating endothermic reactions that have historically contributed to high levels of energy use in cement production.

CO_2-Free Feedstocks: Our selection of raw materials is designed to be CO_2-neutral. The feedstocks involved in OPUS ZERO™ do not release CO_2 when processed, inherently sidestepping the emissions that traditional cement can't avoid.

Renewable Energy Integration: Using zero-carbon renewable energy sources, primarily heat rather than electricity, we can produce a cementitious material that truly operates outside the carbon cycle, with zero or near zero CO_2 emissions from cradle to gate.

OPUS ZERO™ concrete isn't a distant promise - it's a developing reality. Current testing shows our product matching, and even exceeding many important performance metrics of legacy cement. We're refining the properties of OPUS ZERO™ to mirror those of traditional concrete as closely as possible. Making the switch to OPUS ZERO™ a seamless transition is one of our top priorities and biggest challenges. OPUS ZERO™ concrete trials will begin in 2024!

True zero CO_2 cement (not net zero!) is within reach and we believe it doesn't have to cost the Earth – financially or environmentally.

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For additional information, please contact us:
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