Technology Overview

Cement production involves a process called pyroprocessing, where a mineral mixture is heated at high temperatures to create concrete. This method is carbon-intensive and a major contributor to greenhouse gas (GHG) emissions globally.\(^1\) In 2022, the U.S. produced an estimated 95 million metric tons (MMT) of cement, emitting nearly 70 MMTs of CO\(_2\), the highest production volume recorded between 2010 and 2022.\(^2\)

To address this environmental concern, low embodied carbon bio-concrete technology introduces a biologically derived alternative to ordinary Portland cement (OPC). This innovation replaces carbon-intensive pyroprocessing with a specialized process that uses enzymes and bacteria to grow durable cement at ambient temperatures. Specifically, a ureolytic microbial system is employed to create calcium carbonate biocement, creating a strong, durable, low-carbon cementitious binder.

Why is GSA Interested?

This technology functions much like standard cement but significantly reduces greenhouse gas emissions in the production process. According to the manufacturer, it has the potential to cut CO\(_2\) emissions from cement production by up to 85% compared to traditional methods. These pavers, akin to precast concrete, are resistant to stains, environmentally friendly (LBC Red list Free\(^3\)), and boast a lifespan of over 30 years with minimal maintenance requirements.

Deployment Potential

The precast concrete-like pavers are applicable for non-structural interior or exterior applications, such as 2” exterior pedestrian pavers and 3/4” wall tiles.

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The GPG program enables GSA to make sound investment decisions in next generation building technologies based on their real world performance.

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