

TECH OFFER

Transforming Agricultural Waste into High-Purity Silica and Carbon Materials



KEY INFORMATION

TECHNOLOGY CATEGORY:

Sustainability - Circular Economy

Sustainability - Low Carbon Economy

Waste Management & Recycling - Food & Agriculture

Waste Management

Chemicals - Inorganic

Materials - Plastics & Elastomers

TECHNOLOGY READINESS LEVEL (TRL): **TRL9**

COUNTRY: **JAPAN**

ID NUMBER: **TO175463**

OVERVIEW

The global silica market exceeds US\$70 billion annually and grows over 7% each year, driven by demand from the semiconductor, tire, and green construction sectors. Despite this growth, conventional silica production relies on mined quartz, harsh chemicals, and energy-intensive processes, creating high costs and environmental burdens. There is an urgent need for sustainable, low-carbon alternatives that deliver industrial performance without a “green premium.” This patented technology converts agricultural residues such as rice husks into two high-value products: ultra-pure amorphous silica and biomass-derived carbon through a single, chemical-free process. It eliminates chemical waste, reduces CO₂ emissions, and can be implemented locally, turning waste into valuable materials. The technology provider is seeking rice producers, companies, and institutions

globally interested in sustainable silica and carbon, as well as R&D organizations and universities advancing green materials and biomass utilization.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology employs a proprietary single-firing process to directly convert agricultural residues into two high-value products: ultra-pure silica ($\approx 99.7\%$) and carbon. The process requires no harsh chemicals, making it safe, sustainable, and simple to operate. Compared with conventional alternatives, this process significantly reduces CO₂ emissions and maintains an exceptionally low environmental footprint. Designed for decentralized use at the source of agricultural waste, the system is well suited for small- to medium-scale facilities and can be seamlessly integrated into existing industrial processes. However, the performance of the carbon product has not yet been proven in actual operational environments and has only been demonstrated at the pilot level.

POTENTIAL APPLICATIONS

The technology can be applied across industries requiring high-purity silica or functional carbon materials, including:

- Cosmetics: eco-friendly white silica for skincare and powder formulations
- Tires: reinforcing filler for sustainable rubber compounds
- Concrete and Construction: strength-enhancing additive with carbon credit benefits
- Semiconductors and Glass: high-purity amorphous silica feedstock
- Energy Storage: conductive carbon for lithium-ion and sodium-ion batteries

UNIQUE VALUE PROPOSITION

- Achieves high purity and cost efficiency in a single clean process
- Produces silica with an amorphous structure and ultra-white color, outperforming typical biomass-derived materials
- Bridges industrial performance and sustainability, enabling partners to meet ESG goals while maintaining profitability