

This technology enables the efficient conversion of perlite (obsidian), a common volcanic glass, to high-quality, glass microspheres.

For years Japan has successfully used titanium dioxide (TiO₂) colloids in many ways as detoxifying and sterilizing agents to clean indoor air and liquids.

The spheres are also useful as fillers in lightweight composite materials for buildings and other applications.

THE OPPORTUNITY

TiO₂ is a potent photocatalyst that can break down almost any organic compound it touches when exposed to sunlight in the presence of water vapor. Today, companies are developing a wide range of products that seek to capitalize on this reactivity, including self-cleaning fabrics, auto body finishes, and ceramic tiles.

Also in development is a paving stone that uses the catalytic properties of TiO₂ to remove nitrogen oxide from the air, breaking it down into more environmentally benign substances that can then be washed away by rainfall.

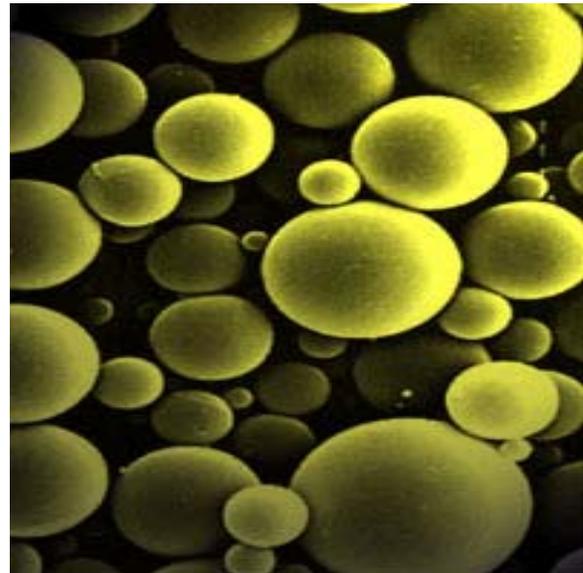
The U.S. is the world's largest producer of perlite.

PATENTED TECHNOLOGY

Current U.S. patents granted that protect the technology include:

<i>US Patent</i>	<i>Features</i>
6,110,528	<ul style="list-style-type: none"> Efficient preparation of TiO₂-coated hollow glass spheres.
5,833,728	<ul style="list-style-type: none"> Hollow glass spheres with high strength and excellent whiteness. Similar claims to '255 with terminal disclaimer.
5,614,255	<ul style="list-style-type: none"> Uses aluminum sulfate and urea foaming solution. Excellent whiteness and mechanical strength.
5,017,523	<ul style="list-style-type: none"> Enables production of hollow glass spheres from starting material of 20µm or less. Useful as filler in lightweight composite materials for buildings.

The process involves an acid-leaching treatment with hydrochloric or sulfuric acid at 150 to 200 degrees C, followed by a heat treatment process for finishing.



INTELLECTUAL CAPITAL

On April 1, 2001, Japan's National Institute of Advanced Industrial Science and Technology began operations as the "new" AIST.

The new AIST is a research organization that comprises 15 research institutes previously under the former Agency of Industrial Science and Technology in the Ministry of International Trade and Industry and the Weights and Measures Training Institute.

AIST is Japan's largest public research organization with research facilities and more than 3,200 employees across Japan.

One of the inventors, Kumio Kimura, has published extensively on the subject of glass microspheres. For example, see: "Preparation of TiO₂-Coated Hollow Glass Microspheres from Titania-Hydrate-Coated Fine Volcanic Glass" by Dae-Yong Shin and Kunio Kimura, *Journal of the Ceramic Society of Japan*, **107:775-779** (No. 9, 1999).

FOR MORE INFORMATION

AIST is seeking to license these technologies and assist with their commercialization success to qualified organizations.

Consideration will be provided to a range of financial, strategic, and commercial investment options.

Contact: Michael F. Allan
 Tel: 216-881-8526
 Fax: 216-881-8522
 email: mfallan@firstprincipals.com
 Website: <http://www.firstprincipals.com>