

# HYDROGEN STORAGE

**INCOM**

Bright Ideas in Fiber Optics

# GLASS MICROSTRUCTURE TECHNOLOGY

## GLASS STRONGER THAN STEEL

**INCOM TECHNOLOGY MAKES EFFICIENT HYDROGEN STORAGE POSSIBLE.** Emissions-free hydrogen is the ideal fuel for the 21st century. Hydrogen fuel cells convert hydrogen to electricity, with only heat and water as byproducts. They have the potential to replace current power sources in multiple applications because they are energy-efficient and clean.

**INCOM BOROSILICATE GLASS CAPILLARY STORAGE SYSTEM ENABLES FUEL CELLS TO REPLACE THE CONVENTIONAL BATTERY.** Incom, in conjunction with C.En (Switzerland) and world renowned BAM, Federal Institute for Materials Research and Testing (Berlin, Germany), have teamed up to develop a storage system that will revolutionize hydrogen-powered batteries.

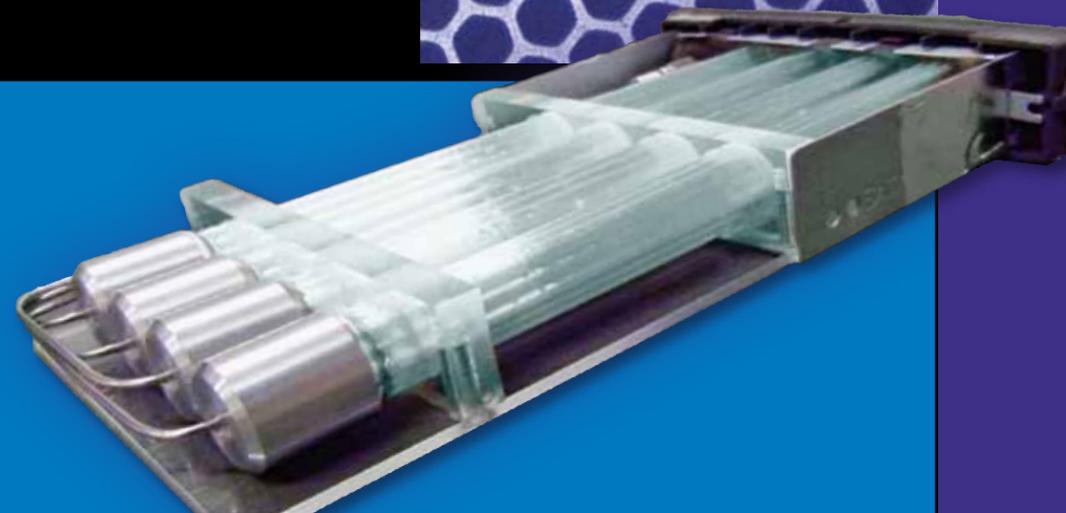
At the heart of this system are thin glass capillaries with wall thicknesses of only a few microns. Three to four times stronger than steel, they can withstand pressures of more than 150 MPa. Bundling thousands of these capillaries leads to lightweight structures that may be sized and shaped to meet specific application needs.

The properties of borosilicate glass in such dimensions are extraordinary and are not possible with steel or any other synthetic material. Furthermore, glass is a superior hydrogen barrier that can remain leak-proof for years. This system is also immune to many environmental influences.



Long & Slim	Compact	Customized
65 x 6 x 2 cm	35 x 10 x 3 cm	35 x 15 x 9 cm
66,000 capillaries	250,000 capillaries	600,000 capillaries
50.5 Wh*	137 Wh*	328 Wh*

\*Values given for a storage pressure of 70 MPa.



### WITH THE SUCCESS OF THIS TECHNOLOGY ALREADY DEMONSTRATED, THE POSSIBILITIES ARE TRULY ENDLESS:

Transportation including:  
cars, submarines and ships

Gas storage systems

Emergency/off-grid power supplies

Camping and emergency  
generators

Small consumer electronics

including: mobile phones,  
laptops and tablet computers

## DISCOVER THE ADVANTAGES OF INCOM'S GLASS MICROSTRUCTURE TECHNOLOGY.

In hydrogen fuel cell applications, Incom's borosilicate glass technology provides numerous benefits for engineers, designers, manufacturers and consumers:

**SAFETY.** Bundling of small pressure-resistant glass microstructure vessels to one another creates an extraordinarily strong structure.

**EXCEPTIONAL STRENGTH-TO-WEIGHT RATIO.** Work with the highest gravimetric storage capacities available. Incom's glass microstructures allow for pressure resistances up to 150 MPa.

**UNRESTRICTED SHAPE AND VOLUME.** Extraordinary shapes and geometries are possible due to freedom in spatial directions and arrangement. Volume capacities can range from one liter to thousands. Incom's technology allows the design of modular, small-sized storage units that can utilize available space in existing electronics.

**RAPID REFUELING.** Refilling is realized in seconds by a connection to existing hydrogen infrastructure. Storage units are easily and quickly connected to gas supply or fuel cells for energy generation.

**LEAK-PROOF DURABILITY.** There is no Hydrogen loss if the storage container remains unused for years.

*Hydrogen storage is a key enabling technology for the advancement of hydrogen and fuel cell power technologies in transportation, battery power, portable and stationary applications.*

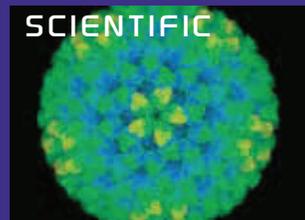
*U.S. Department of Energy*

# THE WORLD LEADER IN FUSED FIBER OPTICS & MICROSTRUCTURES



Incom fiber optic faceplates enhance image quality and significantly improve sensor-protection in medical and dental digital radiography. We also

make tapers for endoscope illuminators and lightguides for epoxy curing tips.



Incom fiber optic tapers and faceplates are used in X-ray crystallography, electron microscopy and high-speed DNA sequencing cameras.

We are the leading fiber optic taper supplier to the scientific marketplace.



Incom advanced fiber optic technology enables direct contact imaging, offering high throughput and increased signal-to-noise ratio for more

efficient analysis. Included are microwell arrays—providing optically isolated, high density analytical sites—as well as tapers and faceplates providing significantly increased speed and data integrity in microfluidic testing.



Incom fiber optic components are used in night vision goggles, heads-up displays, bioterrorism detection systems and biometric identity solutions. We meet all applicable mil specs.

**INCOM IS THE WORLD LEADING MANUFACTURER OF FUSED FIBER OPTICS.** Partnering with us extends your development resources to include a team of prototyping experts and PhDs in material science and glass chemistry.

**CONSIDER THE VALUE OF INCOM'S WHOLE VENDOR RELATIONSHIP.** When you purchase faceplates from Incom, you lower your business costs, improve product consistency and become a partner with the world's largest provider of fused fiber optics. Other manufacturers cannot provide the experience, manufacturing capabilities and advanced business infrastructures that make Incom the true leader in the field of fused fiber optics. Incom helps purchasing agents and OEMs succeed from every perspective:

- ❖ Lower the cost of doing business with product consignments and timely deliveries.
- ❖ Build your OEM reputation by bringing to market products made by the world leader.
- ❖ Reduce technical support costs.
- ❖ Buy with confidence from the company that understands technical and manufacturing issues.

How could your company put these resources to work?  
Contact the experts at Incom to find out.



**Bright Ideas in Fiber Optics**

294 SOUTHBRIDGE ROAD CHARLTON, MA 01507  
PH 508-909-2200 WWW.INCOMUSA.COM SALES@INCOMUSA.COM