U.S. DOE HIGH-TEMPERATURE ELECTROLYSIS MANUFACTURING WORKSHOP MARCH 8, 2022

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SAINT-GOBAIN

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Saint-Gobain Ceramics – Your trusted partner



One of top 100 **most innovative** groups in the world for the last 9 years



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Commitment: carbon neutrality in 2050

SAINT-GOBAIN CERAMICS: A CENTURY OF PROVEN PERFORMANCE

SEFPRO

Ceramic refractory products & solutions for glass furnaces

Performance Ceramics & Refractories (PCR)

Engineered ceramics and refractory products for extreme operating conditions and high-temperature applications: steel production, metallurgy...

Specialty Grains & Powders (SGP)

Engineered ceramic grains, powders, suspensions, & chemicals for a wide range of industries: abrasives, aerospace, automotive, energy, semiconductors, etc.

Quartz

Products for civil & non-civil aerospace industry as well as railway industry

ZIRPRO

Ceramic grinding beads, blasting and peening media, zirconium oxide powders and zirconium chemicals

NORPRO

Ceramic catalyst carriers & process ceramics for refining, petrochemical, chemical, environmental & gas processing industries

Crystals

Radiation detection for medical, security, oil & gas exploration and environmental monitoring. Sapphire for medical, industrial electronics, aerospace and protection applications.

Valoref

Refractory waste management for glass industry



6,000 employees



Manufacturing and sales operations in **16 countries**



Strong innovation DNA 5% sales invested in R&D





SAINT-GOBAIN CERAMICS: SOLVING THE GRAND CHALLENGES OF TOMORROW

TOGETHER, WE ENGINEER A BETTER, SAFER AND GREENER WORLD









CERAMIC SOLUTIONS FOR ELECTROLYSIS MARKET



CUSTOMIZED POWDERS & SLURRIES

- Materials: zirconia-doped powders, perovskites, conductive ceramics
- · Scalable and reproducible synthesis methods
- Tailored purity, phase, surface area, etc.



ACTIVE LAYER CONTROL

- Interface engineering to maximize stability
- Active area through microstructural design
- Tailored ionic conductivity

STACK & SUPPORT STRUCTURE DESIGN

- Advanced ceramic processing
- Multi-material construction
- Hierarchical porosity / density structures

THERMAL PROCESSING

 Creep resistant / impurity free kiln furniture Thermal spray materials and equipment Cermet joining & sealing capabilities

Saint-Gobain Ceramics Solution Portfolio







Resistance to extreme environments (high T, corrosive...)

Transport & flow properties & aesthetics

Mechanical Surface properties & hardness

Digital solutions, design, sensing, monitoring









Hierarchical

Shape: powder. pellets, parts

purity & stability

Catalyst selectivity & activity Life cycle solutions







structure, porous, dense...





ELECTROLYSIS PROJECT EXAMPLES

DE-AC05-00OR22725 SIMULTANEOUS ROLL TO ROLL

- Team: Saint-Gobain, Oak Ridge
 National Lab
- Wet-on-wet coating of 6 layers eliminating stacking & lamination steps
- Enabling 5 micron barrier layer





DE-EE0008377 MATERIAL DEVELOPMENT

- Team: Saint-Gobain, Boston
 University, PNNL
- Materials development and stabilization
- Prevented nickelate-ceria reaction

 $La_2NiO4 \rightarrow x LaO_{1.5} + 0.5x NiO$



DE-FE0031972 REVERSIBLE OPERATION

- Team: Saint-Gobain, Boston University, West Virginia University, Worcester Polytechnic Institute, GAIA
- Extend stabilized material set to reversible operation
- Stack design agnostic solutions for mode switching





SAINT-GOBAIN CERAMICS

Innovative material and design solutions - Partnering for success





Leveraging our ceramic materials and process expertise, we are dedicated to being at the forefront of supporting your growth and success.

Ready to begin our new collaboration?

