Meeting the Demands of Renewable Energy: Generation, Capture and Storage

Organosilicon and Metal-Organic Materials

For additional information on Gelest’s Silicon and Metal-Organic based products or to enquire how we may assist in Enabling Your Technology, please contact:

www.gelest.com

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Gelest provides a wide-range of index materials based on silicon, germanium, and tantalum and other metal-organics for direct use or by thermal or hydrolytic stacks. Applications range from AR-coatings to Bragg mirrors and reflectors.

Silicon Nitride, Silicon Carbide and Silicon Carbonitride perform a variety of roles on the topmost active layer of photovoltaic devices. Gelest provides both single-source precursors and precursors used in combination with a secondary reactant such as ammonia or, with PECVD systems, nitrogen.

**Conductive Pastes:** Organic compatible silver pastes are used in conjunction with silver powder to formulate front-side grid-like contacts.

**Silicone Encapsulants:**
- **Siliglide™ 10** – low-friction, “glide” surfaces for glass, vitreous and metal substrates
- **Seramic™ SI-A** – dielectric, thermally resistant SiO2 coatings, deep UV curable
- **Gelest OE41** – optically clear 1.41 flexible 2-component low temperature cure
- **Gelest OE42** – optically clear 1.42 flexible 2-component low temperature cure
- **Aquaphile™ AQ** – water-wettable anti-top coating for glass and ceramics

**Adhesion Promoters:**
- **Silahydrocarbons**
- **Silicate Esters**

**Electrodes, Solid State Electrolytes, Solid State Electrolytes**

**Conductive Pastes:**
- **Gelest offers a range of materials that can be deposited without the vacuum requirements of sputtering techniques. Alternative material technologies that eliminate indium include zinc, antimony and tin-based oxides that can be fluorine doped.**

**Optically Clear Silicone Encapsulants**: silicone ac glass for concentrator PV

**Lifetime Extension for Polymer Back-Sheets**

**Proton Exchange Membrane FC**

- Hydrogen fuel is channeled through field flow plates to the anode on one side of the fuel cell. The electrocatalysts on the anode side of the fuel cell oxidize hydrogen to produce protons and electrons.
- The protons pass through the membrane to the cathode on the other side of the cell.
- Oxygen is fed to the cathode and combines with the electrons to form water, which releases an electrical current.

**Silica membranes.**
**Generation**

**Photovoltaic –**

- **Band-gap Materials:**
  - Silicon, Germanium, Cadmium, Tellurium, Indium, Gallium, and Selenium.
  - Gelest provides a wide-range of index materials based on silicon, germanium, and gallium.

- **Antireflection / All-Angle Coatings:**
  - Triple Junction GaAs Solar Cells / Metamorphic Multijunction Solar Cells. Germanium layers provide lattice match.
  - Gelest offers volatile silylated and non-volatile dithiocarbamate and carboxylate metal chalcogenide precursors.
  - CdTe/CdSe Cadmium Telluride, Cadmium Selenide and CIGS (Copper Indium Gallium Selenide) precursors.

- **Passivation Layers – coatings that prevent carrier recombination:**
  - SiN/SiO.
  - SiC/SiO.

**Conductive Pastes:**

- Gelest offers precursors for vapor phase and solution phase deposition of Groups III-V, II-VI, and IV (Si/Ge) stacks. Applications range from AR-coatings to Bragg mirrors and reflectors.

**Conductive Pastes:**

- Organically compatible silver salts are used in conjunction with silver powder to form low-resistance contacts.

**Optically Clear Silicone Encapsulants:**

- Silicone air-gaps for photovoltaic PV.

**Adhesion Promoters:**

- Siliglide™ – low-friction, glide surfaces for glass, vitreous and metal substrates.

**Silica, alumina, aluminosilicates, Functionalizing agents for porous silica membranes.**

**Proton Mobility Facilitators:**

- Monomers for High Temperature Proton Exchange Membranes Inorganic Scaffold Materials:
  - Silica, alumina, aluminosilicates, Functionalizing agents for porous silica membranes.

**Electrodes, Solid State Electrolytes, Proton-conducting solids –**

- Ceria (cerium oxides) by sol-gel and pyrolytic deposition.

**Turbine Lubricants for Low Temperature Environments**

- Silahydrocarbons

- Silicate Esters

**Catalysts – Nanowires**

- GED3000

- SIT725.0

- SIT723.0

**Polymer Electrolyte Membranes**

- Proton Exchange Membrane FC

- • Silica, alumina, aluminosilicates, Functionalizing agents for porous silica membranes.

**Proton Exchange Membranes**

- Nafion, Alkali, Ammonium, Functionalizing agents for porous silica membranes.

**Monomers for High Temperature Proton Exchange Membranes**

- Inorganic Scaffold Materials:
  - Silica, alumina, aluminosilicates, Functionalizing agents for porous silica membranes.

**Fuel Cells –**

- Proton Exchange Membrane FC

- Polymer

- Carbon

- SnO:F, ZnO:Al, Sb:TO

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  - Gelest offers volatile silylated and non-volatile dithiocarbamate and carboxylate metal chalcogenide precursors.
- CdTe/CdSe – Cadmium Telluride, Cadmium Selenide and CIGS (Copper Indium Gallium Selenide) precursors.
- Silicon Nitride, Silicon Carbide and Silicon Carbonitride and perform a variety of roles on the topmost active layer.
  - Passivation Layers – coatings that prevent carrier recombination.
- Transparent Conductive Oxide Coatings – TCOs:
  - SnO:F, Zno:Al, Sb:Te.

**Optically Clear Silicone Encapsulants**
- Silicon dioxide – glass-like for concentrating PV.
- Lifetime Extension for Polyamide Back-Sheets.

**Adhesive Promoters**
- Siliglaze™ – low-friction, “glide” surfaces for glass, vitreous and metal substrates.
- Ceria (cerium oxides) by sol-gel and pyrolytic deposition.
- Water.

**Proton Exchange Membrane FC**
- Monomers for High Temperature Proton Exchange Membranes Inorganic Scaffold Materials:
  - Silica, alumina, aluminosilicates. Functionalizing agents for porous silica membranes.
- Proton-conducting solids – Proton-exchange membranes.
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**Wind Turbine**
- Proton Mobility Facilitators
- Turbine Lubricants for Low Temperature Environments
- Silahydrocarbons
- Silicone Esters

**Fuel Cells – Proton Exchange Membrane FC**
- Catalysis – Nanowires
- Catalysts – Nanowires
- Turbine Lubricants for Low Temperature Environments
- Silahydrocarbons
- Silicone Esters

**Coupling Agents for Composites**
- High-Speed Polyester
- Polyester
- Moisture Resistant Epoxy
Gelest, Inc.

Provides technical expertise in silicon and metal-organic materials for applications in alternative energy. The core manufacturing technology of Gelest is silanes, silicones and metal-organics with the capability to handle flammable, corrosive and air sensitive materials. Headquartered in Morrisville, PA Gelest is recognized worldwide as an innovative manufacturer and supplier in commercial and research quantities, serving advanced technology markets through a material science driven approach.

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