Catalysts and Adsorbent Products for a “Sustainable Renewables Industry”

Grace Davison Renewable Technologies

The world market for renewable fuels and chemicals has expanded rapidly in recent years. Continued growth is heavily dependent on the economic conversion of biomass, which requires development of new technologies and applications for the next-generation of fuels and bio-based chemicals.

Grace Davison has the ability to tailor the size, shape, surface characteristics and functional components of a wide range of inorganic materials to meet the needs of specific applications. This has resulted in a matrix of specialty catalysts, adsorbents and desiccants for the petrochemical, chemical, pharmaceutical and renewables industries.

The Renewable Technologies product line draws on Grace Davison’s expertise in catalysis and separations to develop and provide technologies for purification, drying and biomass conversion.

The Renewable Technologies product portfolio includes:
- EnSieve® molecular sieve for ethanol dehydration
- TriSyl® silica and EnPure® adsorbents for feedstock and biodiesel purification
- EnRich™ catalysts for renewable fuels and chemicals
Catalysts and adsorbents for the conversion of renewable feedstocks to fuels and chemicals

Business Strengths:
- Materials science core competency
- Catalyst development and scale up expertise
- Strong relationships with oil refiners and petrochemical producers
- Proven history of manufacturing excellence

Renewable Fuels and Chemicals
Renewable Technologies has built on Grace Davison’s expertise in catalysis and separations to develop improved adsorbents, catalysts and desiccants that enable the production of renewable fuels and chemicals.

Feedstock
- Natural and Algal Oils
- Corn
- Sugarcane
- Cellulosic Biomass

Process
- Upgrading
- Thermochemical Biochemical Conversion

Product
- Biodiesel Renewable Diesel
- Ethanol Green Gasoline Green Diesel Chemicals

Grace Products:
- Adsorbents
- Catalysts
- Desiccants

Catalysts and Adsorbent Products for a “Sustainable Renewables Industry”
Renewable Technologies Product Portfolio

Our portfolio is a matrix of specialty catalysts, adsorbents and desiccants that efficiently convert biofeedstocks to renewable fuels and chemicals.

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<tr>
<th>EnSieve® Molecular Sieve for Ethanol Dehydration</th>
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<td>Superior rate of adsorption and ethanol recovery</td>
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<td>Minimal attrition</td>
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<td>Produce ultra-dry ethanol with EnSieve® molecular sieve</td>
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<td>Because traditional distillation techniques fall short of drying ethanol to an acceptable level, water removal with molecular sieve adsorbents (zeolites) is the method of choice. In our pursuit of helping customers obtain high ethanol contents we have developed EnSieve® molecular sieve.</td>
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<tr>
<td>Designed for ethanol dehydration, EnSieve® molecular sieve offers outstanding benefits. Its unique structure provides a superior rate of adsorption and higher ethanol recovery due to the low co-adsorption of ethanol. Its minimal attrition means longer service life. Product composition minimizes side reactions such as the formation of aldehydes and ketones.</td>
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<th>EnRich™ Catalysts for Renewable Fuels and Chemicals</th>
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<td>Catalysts customized for thermochemical renewable processes (pyrolysis, biomass to liquids, transesterification, chemicals)</td>
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<td>Catalysts for the efficient conversions of glycerin to propylene glycol and ethanol to ethylene</td>
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<td>Supports to extend enzyme life in biochemical processes</td>
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<td>Convert natural oils and cellulosic biomass with EnRich™ catalysts</td>
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<td>Catalysts to synthesize fuels, chemicals and polymers from bio-derived sources and by-products are the critical components necessary for the success of thermochemical and other next generation technologies. Grace Davison has customized catalyst platforms for production of biodiesel and bio-based chemicals such as propylene glycol and ethylene.</td>
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<td>The processing of renewable oils in conventional refining equipment is also possible today with EnRich™ catalysts. Ongoing research and development of supplementary catalysts is focused on other potentially valuable compounds.</td>
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<td>Additionally, Grace Davison has developed enzyme carriers for industrial processes. Immobilizing an enzyme often reduces the enzyme cost per unit of product.</td>
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<th>TriSyl® Silica and EnPure® Adsorbents for Feedstock and Biodiesel Purification</th>
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<td>Improved yield and enhanced biodiesel product quality</td>
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<td>Eliminates need for water washing</td>
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<tr>
<td>Remove impurities with TriSyl® silica and EnPure® adsorbents</td>
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<tr>
<td>Here’s an easy answer to one of the most complex economic and environmental challenges in biodiesel production and refining: just add TriSyl® silica and EnPure® adsorbents to the process.</td>
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<td>With its unsurpassed ability to remove polar contaminants TriSyl® silica cleans feedstock oils and EnPure® silica often eliminates the need for water washing. Their efficiency enhances yield and product quality, while reducing plant effluents. Grace adsorbents will help improve process control and reduce operating costs.</td>
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Grace Davison Specialty Catalysts & Process Technologies provides innovative catalyst-based solutions and processing aids for polymers, petrochemical and renewable industries.

Grace Davison is a global leader in silica and alumina materials, science and technology. Please contact your local Grace representative if you would like more information on Renewable Technologies.

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