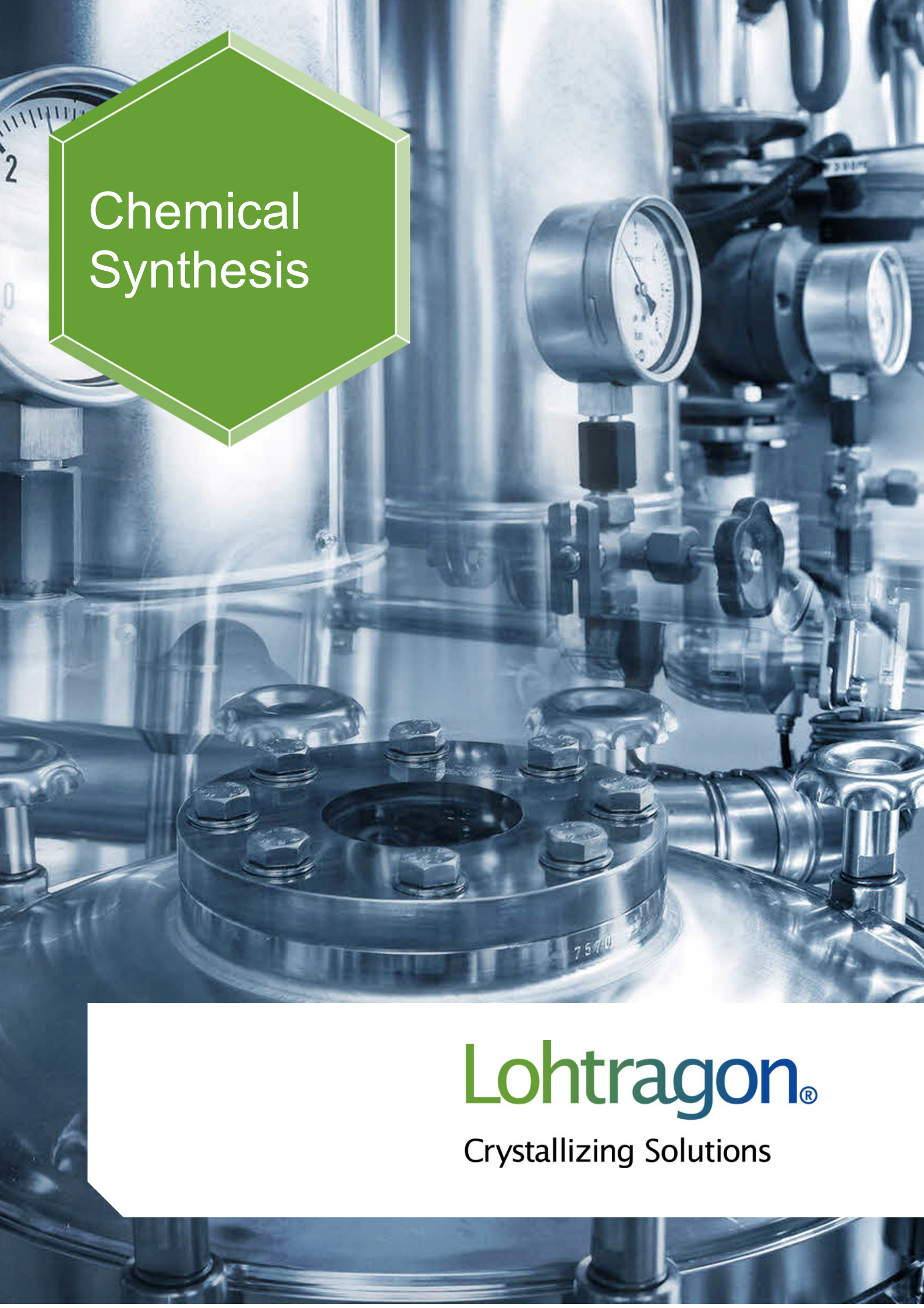


Chemical Synthesis

Lohtragon®

Crystallizing Solutions

Lohtragon®

Info Sheet Lohtragon®

Chemical Synthesis – Catalysts

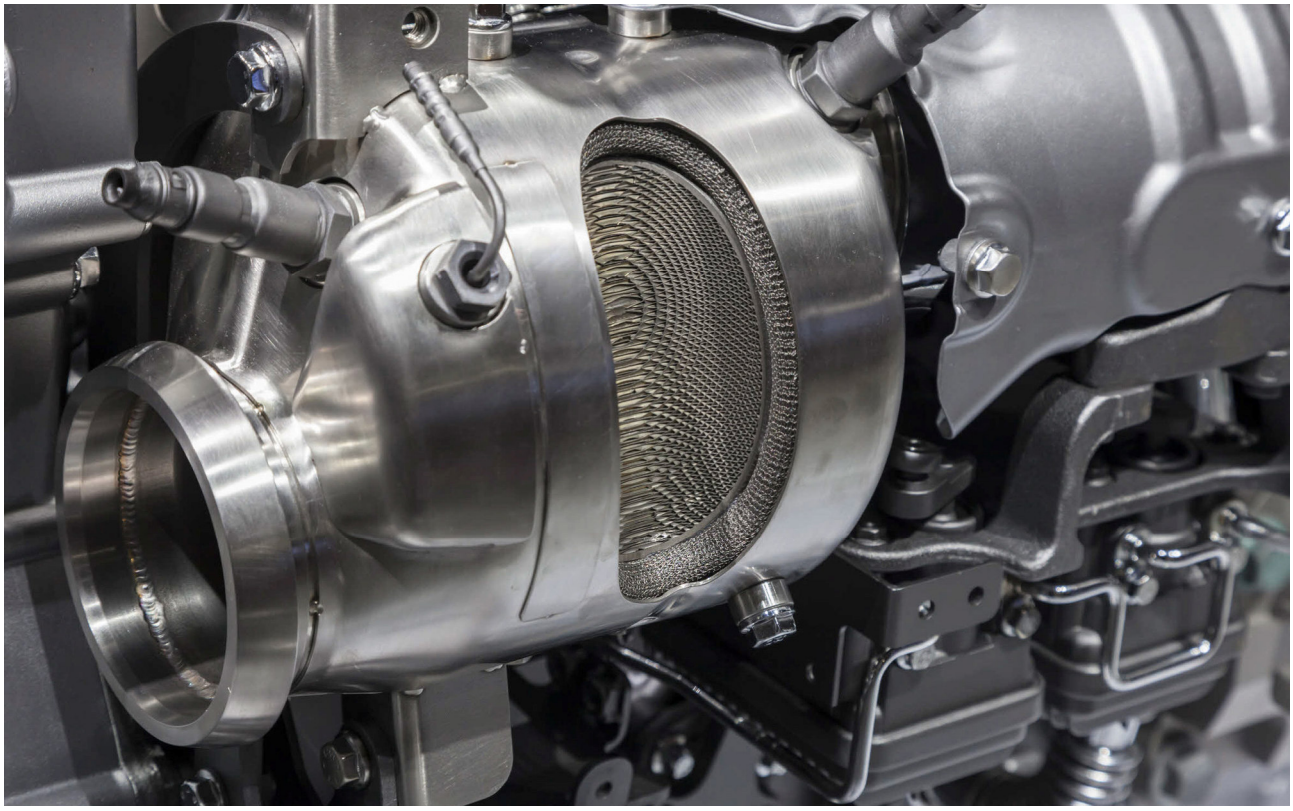
Catalysts are essential substances for an optimized efficiency of chemical reactions. Powerful catalytic systems contribute to a sustainable and a resource-saving production process by

- Increased yields
- High chemical selectivity and avoidance of by-products
- Reduced energy consumption

In the wide field of chemical catalysis metal salts play an important role. Lohtragon® high performance metal salts

- Are primarily used as precursors for heterogeneous catalysts
- Function as active catalysts
- Act as auxiliary materials

Due to the manifold catalytic activities of metal salts this info sheet only provides an outline about the catalytic possibilities with our Lohtragon® range.



Features & Benefits

- Specially controlled and pure product qualities
- Reproducible product properties with best possible batch-to-batch consistency
- Wide capabilities in modifying chemical and physical parameters
  - Optimized active content
  - Variation of pH-value
  - Adapted particle design
- Target-oriented developments by using state-of-the-art analytical equipment

Chemical Synthesis – Catalysts

Lohtragon® Product Selector – Precursors for Heterogeneous Catalysts

The function and performance of metal salts acting as precursors for heterogeneous catalysts are linked to both their cation (source for metal and/or metal oxide) and their anion (determines the decomposition properties).

Product / Function	Used substance	Product description	Features
Source for Aluminium Oxide **Lohtragon® K87**	Aluminium Nitrate Solution	aqueous solution	♦ Low decomposition temperature
Lohtragon® L87	Aluminium Lactate Solution	aqueous solution (powder available, too)	♦ Decomposition gas does not contain nitrous fumes
Source for Calcium Oxide **Lohtragon® O01**	Calcium Acetate	powder (aqueous solution available, too)	♦ High solubility ♦ Good thermal decomposition behavior by forming the decomposition gas acetone
Lohtragon® B68	Calcium Formate	crystals	♦ High solubility ♦ Good thermal decomposition behavior
Lohtragon® O43	Calcium Nitrate 4-hydrate	crystals (aqueous solution available, too)	♦ Pure product without ammonium
Source for Copper metal and its Oxide **Lohtragon® K02**	Copper(II) Acetate 1-hydrate	crystalline powder	♦ Low thermal decomposition temperature of below 250 °C
Lohtragon® K01	Copper(II) Hydroxide Carbonate	powder	♦ High purity grade with low amount of trace metals
Source for Iron metal and its Oxide **Lohtragon® C07**	Ferric Ammonium Citrate, brown	powder (aqueous solution available, too)	♦ High solubility ♦ Good thermal decomposition behavior ♦ Usable at high pH level
Lohtragon® C05	Ferric Citrate	powder	♦ Good solubility in hot water
Lohtragon® E36	Ferric Nitrate 9-hydrate	crystals	♦ High solubility ♦ Good thermal decomposition behavior
Source for Iron Oxide **Lohtragon® O20**	Ferric Ammonium Oxalate 3-hydrate	fine crystals	♦ Residue-free decomposition

The information given in the document corresponds to our current knowledge. We warrant in the frame of our General Terms and Conditions of Sale that our products are manufactured in accordance with the specifications. However, we disclaim any liability with regard to the suitability of our products for a particular purpose or application or their compatibility with other substances. Tests have to be performed by the customer who also bears the risk in this respect. Nothing herein shall be construed as a recommendation to use our products in conflict with third parties' rights.

Chemical Synthesis – Catalysts

Lohtragon® Product Selector – Precursors for Heterogeneous Catalysts

Product / Function	Used substance	Product description	Features
Source for Magnesium Oxide **Lohtragon® K19**	Magnesium Acetate 4-hydrate	crystals (aqueous solution available, too)	♦ Low decomposition temperature by forming nano-scaled magnesium oxides
Lohtragon® K92	Magnesium Acetate, anhydrous	powder	
Lohtragon® V15	Magnesium Sulfate, dried	powder	♦ Forms spinel type oxides ♦ High decomposition temperature
Source for Manganese Oxide **Lohtragon® O03**	Manganese(II) Acetate 4-hydrate	crystals	♦ Low decomposition temperature
Source for Zinc metal and its Oxide **Lohtragon® O08**	Zinc Hydroxide Carbonate	powder	♦ Insoluble in water
Lohtragon® O57	Zinc Sulfate Solution	aqueous solution	♦ Manufacture of zinc-based catalysts
Lohtragon® O59	Zinc Sulfate 1-hydrate	powder (7-hydrate available, too)	♦ Very good solubility in water, high purity grade with low amount of trace metals

Lohtragon® Product Selector – Active Catalysts

The Lohtragon® metal salts themselves can act as active catalysts in transesterification, trimerisation and hydrogenation. These are only few of the possible reactions these catalysts accelerate.

Product / Function	Used substance	Product description	Features
Transesterification **Lohtragon® K19**	Magnesium Acetate 4-hydrate	crystals (aqueous solution available, too)	♦ Free-flowing powder for easy dosing
Lohtragon® K92	Magnesium Acetate, anhydrous	powder	♦ Low water content for better compatibility with polymers
Lohtragon® O03	Manganese(II) Acetate 4-hydrate	crystals	♦ High purity grade
Lohtragon® O02	Potassium Acetate, anhydrous	powder (aqueous solution available, too)	♦ High purity grade
Lohtragon® B71	Potassium Formate	powder (aqueous solution available, too)	♦ High purity grade
Lohtragon® O16	Dipotassium Oxalate 1-hydrate	crystals	♦ High purity grade
Lohtragon® O56	Zinc Acetate, anhydrous	powder (2-hydrate available, too)	♦ Low heavy metal content

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Chemical Synthesis – Catalysts

Lohtragon® Product Selector – Active Catalysts

Product / Function	Used substance	Product description	Features
Trimerisation (PIR) **Lohtragon® O02**	Potassium Acetate, anhydrous	powder (aqueous solution available, too)	♦ High purity grade, consistent from lot to lot
Lohtragon® B71	Potassium Formate	powder (aqueous solution available, too)	♦ High purity grade
Hydrogenation **Lohtragon® K01**	Copper(II) Hydroxide Carbonate	powder	♦ Low heavy metal content

Lohtragon® Product Selector – Auxiliary Materials

Product / Function	Used substance	Product description	Features
Glass-ceramic Carriers **Lohtragon® C36**	Magnesium Carbonate	powder	♦ Degassing properties during melting, very high purity to achieve well defined compositions
Complexing Agent and pH Buffer **Lohtragon® O05**	Ammonium Acetate	crystals (aqueous solution available, too)	♦ Solubility enhancer and complexing of unwanted trace elements like Ca/Mg
Lohtragon® B75	Diammonium Hydrogen Citrate	crystals	
Lohtragon® B72	Ammonium Formate	crystals (aqueous solution available, too)	
Lohtragon® O16	Dipotassium Oxalate 1-hydrate	crystals	
Flux Agent **Lohtragon® E11**	Sodium Carbonate, anhydrous	powder (1- and 10-hydrate available, too)	♦ For metal oxide catalyst preparations, high purity grade with very low chloride and sulfate content

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Lohtragon® – A Brand of Dr. Paul Lohmann®

For over 135 years, the company Dr. Paul Lohmann has been able to establish and maintain its leading position as an international manufacturer of mineral and metal salts that meet the highest quality standards. The product range includes over 400 different salts, from Aluminum to Zinc, in a total of over 7,000 different specifications.
Dr. Paul Lohmann® supplies its specialty salts worldwide to customers in the pharmaceutical industry, food sector, food supplements, cosmetics and – under the Lohtragon® brand – to customers in industrial applications.

Lohtragon® stands for unique competences in manufacturing, optimizing and developing metal salts for a broad variety of industrial market segments. Established in diversity, tailor-made for you, your application and your process - our solution for your challenges!

Established Products

By choosing Lohtragon® products, you benefit from direct manufacturer sourcing and our “Made in Germany” quality and reliability promise.

Joint Developments

From concept phase to tailored product optimization, we are your partner to solve any development challenge.

Expert Services

Rely on services from our application technology, regulatory affairs, logistics, quality departments and more.

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