HYDROTALCITES IN CATALYSIS

UNIQUE PRODUCTS THROUGH UNIQUE TECHNOLOGIES
**Product Description**

Hydrotalcites are layered double hydroxides (LDH) that contain positively charged hydroxide layers and charge balancing anions in the interlayer region. The hydrotalcites produced by our proprietary technology are highly pure compounds of magnesium and aluminium with optional zinc. These products have significant anion-exchange capacity and behave as solid bases. The active base sites of hydrated hydrotalcite materials are mainly structural hydroxyl anions. Their basicity can be affected by structural and compositional parameters. For example, cations like Zn or Ni give lower basicity than Mg. Less basic catalysts are also obtained from Cl\(^-\) or SO\(_4^{2-}\) precursors than from CO\(_3^{2-}\) containing materials. Another influence on the basicity is the Mg/Al ratio. When hydrotalcites are calcined (typically at 400-500 °C), mixed oxides are formed that have strong Lewis basic O\(^2-\)-M\(^{n+}\) pairs.

**Hydrotalcite as catalyst**

The use of hydrotalcites and their derivatives in catalysis has received extensive attention in academic research and from industrial parties. We are able to manufacture a wide range of hydrotalcites, to help you capitalize on the many advantages of these environmentally friendly materials.

**The Inventors of Synthetic Hydrotalcite**

In 1966, Kyowa Chemical Industry was the first company to succeed in the industrial synthesis of hydrotalcite. Since then, Kyowa and its daughter Kisuma Chemicals have continuously worked on product optimization and development to ensure that our quality and expertise are still unrivalled in the market today. Other products we produce include highly pure MgO and Mg(OH)\(_2\).

**Modern Factory in the Netherlands**

Our factory was built in 1999, but expansion work practically never stopped. Today, we produce up to 30,000 tonnes of magnesium compounds per year. The plant is strategically located near raw material suppliers and logistic infrastructure, allowing us to transport our products efficiently all over the world.
Catalytic Functionality of Hydrotalcites

There are many advantages to using hydrotalcites compared to other catalyst systems. Hydrotalcites are heterogeneous catalysts, improving the ease of catalyst separation after reaction. Furthermore, hydrotalcites are environmentally more benign (e.g., than heavy metals) and potentially cheaper. Broadly speaking, there are three types of catalyst systems for which hydrotalcites can be used:

- **Redox catalyst.** Various hydrotalcites, generally including copper or a heavy metal, are known to be functional oxidation or reduction catalysts.
- **Acid/Base catalyst.** Our Mg/Al hydrotalcites have a unique and highly tunable structure with both acidic and basic properties. This bi-functionality allows for the use of these materials as catalysts for various organic conversions.
- **Catalyst support.** Hydrotalcites are known to be used as support for numerous catalytic species, such as transition metals, alkali metals and even various anions.

Environmentally Friendly Heterogeneous Catalytic Materials

For catalyst systems, we produce highly pure hydrotalcites that are heterogeneous catalysts or catalyst supports. These environmentally friendly materials behave as solid bases and can be used for a wide variety of reactions. Our state-of-the-art factory in the Netherlands is the single largest production facility for synthetic hydrotalcites in the world. All products coming from this fully automatic manufacturing facility are of the highest available purity and quality.

Innovation Partner

As the world’s largest producer of hydrotalcites, we have extensive experience with the implementation of these materials in a variety of applications. The vast range of chemical processes and specific catalytic systems used in the world today, make it difficult to mention a clear and select range of hydrotalcite products suitable for use in catalytic systems in this brochure. However, we are highly interested to work together with you as a partner to select or develop the optimal hydrotalcite product for your needs. More importantly, we have the resources to do it. From our R&D facilities in the Netherlands and Japan, innovation projects are coordinated. We have several hydrotalcite grades in our portfolio that may already be suitable for your requirements. Besides, there are many parameters of our products that can be tuned, including:

- Molar ratio of hydrotalcite cations
- Interlayer anions
- Desired particle size
- Specific surface area
- Level of calcination

Tip-of-the-Iceberg Inspiration

A search on the terms “hydrotalcite AND catalyst” reveals a plethora of applications. Some examples that may give you inspiration for your own processes:

- Synthesis of polyols
- Methanation of synthesis gas
- Ethanol reforming
- Water gas shift reaction
- Transesterification of soybean oil for biodiesel

Lets Talk!

For more information, or to explore the possibilities for your process, please do not hesitate to contact us today! We are ready to support you with all enquiries involving hydrotalcite.
Continuity Through Innovation

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