

## SYLOSIV® Molecular Sieve Powder for Cosmetic Applications



Many new skin and hair care products, in development or already being sold in the marketplace, use a self-heating mechanism to provide improved functionality, e.g., to support the absorption of nurturing substances by the skin. A safe and inexpensive way to accomplish this is to use SYLOSIV® zeolite based powders, which heat up when the product adsorbs moisture.

### Function of SYLOSIV® Powder

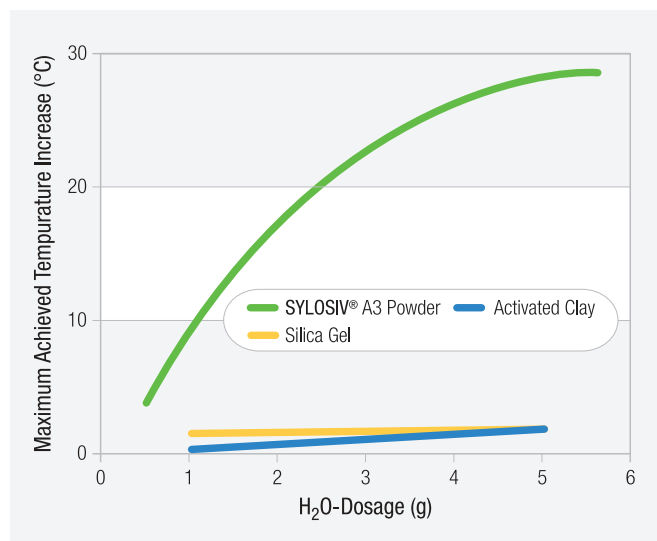
SYLOSIV® molecular sieve powders are highly porous, micronized zeolite crystals with strong hydrophilic character. They show a high affinity to polar substances such as water, which gets strongly adsorbed. This adsorption is an exothermic reaction, and is accompanied by heat formation, also called Heat of Adsorption.

This Heat of Adsorption is much higher for zeolites than for other water adsorbing substances such as silica gel or activated clays. Therefore, less zeolite powder needs to be used to achieve a comparable heat release

#### Heat of Adsorption for Water

SYLOSIV® Zeolite	4187 kJ/kg Water
Silica Gel	2512 kJ/kg Water

to competitive materials. Thus, fewer solids need to be added. This allows more freedom in the formulation of the cosmetics. In addition, the small pore size of the zeolite excludes adsorption of other ingredients of the cosmetic formulations such as fragrances, proteins or oils. The heat release of SYLOSIV® powder happens instantly and can be influenced by the zeolite content in the formulation.



Self-Heating Ability of a 20% Adsorbent Containing Formulation

This heat release caused by contact of the active zeolite powder with water can be used in self-heating cosmetics, and in other applications as well, e.g., as a heat source or for heat control in endothermic chemical reactions.

### Health and Legal Status of SYLOSIV® Powder

At Grace, our first priority is to ensure the safety of all those who come into contact with our products. This is especially true for applications such as cosmetics, food and pharmaceuticals.

SYLOSIV® zeolite powders are non-toxic inorganic materials consisting of silicon, aluminum and alkaline/

alkaline earth cations. The final report\* on the safety assessment of aluminum silicate and zeolite, re-evaluated by the Cosmetic Ingredient Review Expert Panel, concludes that zeolites are safe as used in cosmetic products. \*Published in the International Journal of Toxicology, 22 (Suppl. 1):37-102, 2003

All SYLOSIV® zeolite grades are synthetic materials; thus, they do not show the high variation in composition that natural products may do. According to the current version of Regulation (EC) No. 1223/2009 on cosmetic products, Article 3, the manufacturer has to ensure that a cosmetic product made available on the market shall be safe for human health when used under normal or reasonably foreseeable conditions of use. Our products are tested regularly for their trace content of heavy metals such as Zn, Ni, Cu, Cd, Pb, Cr, As, Hg, Mo, Co, Sb and Se. None of such contaminants are present at levels that could pose any health, safety or regulatory risk.

Zeolite powders are basic materials. The pH of SYLOSIV® zeolite products ranges between 9.5 and 11.5 (measured at 5% zeolite in water at room temperature). The high pH of the zeolite needs to be considered in the formulation of the cosmetics to avoid any skin irritation. Detailed information about the eye irritancy potential of SYLOSIV® zeolite products is available on request.

In addition, as the active material prior to water adsorption is highly hygroscopic, contact with skin and eyes needs to be avoided unless the skin has been wetted with water. The latter is necessary in order to obtain the required heat release effect.

## Addition of SYLOSIV® Powder

SYLOSIV® powders are micronized and consequently can be dispersed by means of a dissolver. Because SYLOSIV® powder adsorbs moisture spontaneously from the air, special care is required in handling. The powder must be stored in hermetically sealed containers; once opened, it should be used as quickly as possible. The more water adsorbed by the SYLOSIV® zeolite powder during the handling/addition process, the less heat will be generated in the later application. This is also true if other water-containing ingredients are used in the formulation. The zeolite, due to its strong water affinity, will dry such ingredients during storage, which, therefore, will reduce its self-heating ability.

## The Right Products for You

SYLOSIV® zeolite products are available in various pore sizes. Usage of a small pore zeolite such as SYLOSIV® A4, A3 and SYLOSIV® K300 zeolite grades is recommended as these grades do not adsorb other ingredients of your cosmetic formulation such as oil or propylene glycol. If the heat release function should be combined with a carrier function, (e.g., perfume release), a wider pore zeolite can be used.

In addition to zeolites, Grace is also offering various silica gel grades for cosmetic applications such as freeflow agents, dentifrice abrasives, absorbents and viscosity controlling agents.

Please contact your regional Grace sales office for advice in selecting the most suitable material for your application. Special product information sheets for each grade are available on request.

Grace has successfully pre-registered all REACH relevant substances. The next step is the ongoing preparation of the required registration dossiers and final registration of our substances. Grace has already fully registered its synthetic amorphous silica and zeolites. Now our customers can have confidence in REACH compliance and supply security beyond 2010. **Non-EU customers should contact us about their import needs.**

## grace.com

### World Headquarters

W. R. Grace & Co.-Conn.  
7500 Grace Drive  
Columbia, Maryland 21044/USA

Tel.: +1 410 531 4000  
NA Toll Free: +1 800 638 6014  
Fax: +1 410 531 4273

### Latin America

Grace Brasil, Ltda  
Alameda Rio Negro, 500  
Alphaville – Barueri  
CEP: 06455-000 – São Paulo – Brasil  
Sala 2201 – Torre B

Tel.: +55 11 3133 2704  
Fax: +55 11 3133 2706

### Europe

Grace GmbH & Co. KG  
In der Hollerhecke 1  
67545 Worms/Germany

Tel.: +49 6241 403 00  
Fax: +49 6241 403 1211

### Asia/Pacific

Grace China Ltd.  
19th Floor, K Wah Centre  
1010 Huai Hai Zhong Road  
Shanghai, 200031/ China

Tel.: +86 21 5467 4678  
Fax: +86 21 5405 1500

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