August 1, 2023
Sanyo Chemical Industries, Ltd.

Newly Developed Pickering Emulsifier that Imparts Excellent Sensory Properties to Emulsions

—Unique spherical silica provides smooth texture without creakiness & brings unprecedented sensory experience to a wide range of cosmetic products—

Sanyo Chemical Industries, Ltd. is pleased to announce that it has developed SOLIEMER®, a particle emulsifier for cosmetics that exhibits excellent formulation stability despite the absence of surfactants and provides a non-sticky smooth texture without creak. SOLIEMER® is our original spherical silica with optimized size, shape, and surface modification. It improves the sensory perception of creakiness that has been a challenge to overcome with conventional Pickering emulsifiers and SOLIEMER® provides highly stable emulsions with a smooth texture and excellent sensory.

Emulsification is a process in which one liquid is dispersed as small spherical droplets into another immiscible liquid, such as oil and water. Their uniformly dispersed state is called emulsion. The substance that acts at the interface of these two liquids to reduce the interfacial tension and create an emulsion is called an emulsifier. Many cosmetics such as milky lotions and creams, are made using with emulsification technology. Surfactants are commonly used as emulsifiers, but the use of the surfactants in cosmetic products may cause adverse effects, such as negative sensory sanitation of slimy feel and/or characteristic odor, and makeup-comes-off due to moisture such as perspiration. In addition, there are restrictions on the type of surfactant that can be used to obtain stable emulsions, depending on the type of oil.

On the other hand, Pickering emulsification*1 is known as a useful emulsification method to overcome the above problems by using solid particles as emulsifiers without using a surfactant. Emulsions obtained by Pickering emulsification are more stable than those obtained by surfactant emulsification and are less likely to separate after emulsification. However, since cosmetic emulsions are usually very complex multi-component mixtures, even with Pickering emulsification, emulsification and post-emulsification stability in cosmetic formulations have sometimes been poor due to the influence of oil types and cosmetic ingredients. In addition, because the Pickering emulsifier is a solid particle, cosmetics using it have a powdery or creaky feel. Furthermore, there were handling difficulties due to the very fine particle size and uneven powder flowability of conventional Pickering emulsifiers.

Sanyo Chemical has developed a unique Pickering emulsifier SOLIEMER®, a submicron size spherical silica whose size, shape, and surface structure are precisely controlled by utilising our expertise in surface control technology, to overcome the problems of creakiness and handling. Normally, it is difficult to obtain stable emulsions with particles of this size, but we have succeeded in obtaining stable emulsions by finding an optimal emulsification method for cosmetic formulations in addition to a surface treatment method for spherical silica. SOLIEMER® is not easily affected by oil types or cosmetic ingredients and can maintain a stable emulsion for a long period of time in a relatively wide range of cosmetic formulations.

With these features, we believe that SOLIEMER® can play an important role in a variety of cosmetic formulations to meet customer needs.

*1 In 1907 Pickering was the first to report that solid particles could be used to emulsify in the same way as surfactants, so emulsification using solid particles as emulsifiers is called "Pickering emulsions" and the solid particles are called Pickering emulsifiers.

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Features

1) Provides O/W emulsions with good sensory properties and high stability
2) Surfactant-free, so there is no surfactant-derived odor or sliminess
3) Good handling of the particles
4) Highly stable emulsions can be prepared in a cold process without the use of heat
5) Capable of emulsifying non-polar mineral oils, polar ester oils, and silicone oils, and is not affected by oil type

Future plans

In cosmetics, in addition to functions such as moisturizing, comfort of use is also important. We believe that "SOLIEMER® " will provide the optimal formulations that satisfy both functionality and comfort of use. We will continue to focus on product development in the cosmetic field and offer comprehensive and attractive solutions.

Information on Cosmetic Ingredients

SOLIEMER ®
INCI Name : Silica Silylate
Name of cosmetic ingredient: Silylated silica
Quasi-drug ingredient name: Silylated silicic anhydride
Chinese INCI name: 甲硅烷基化硅石
Evaporated residue : 100wt%.

<Reference >

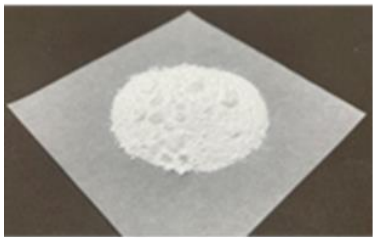


Figure 1: Appearance of SOLIEMER ®

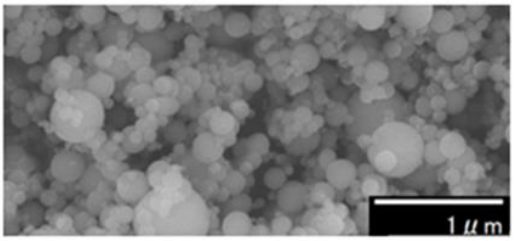


Figure 2: SEM photograph of SOLIEMER ®

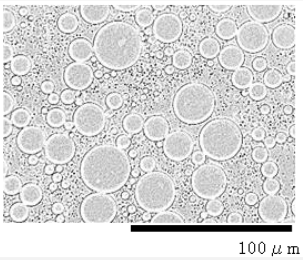
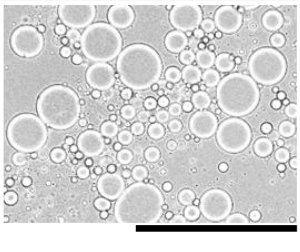
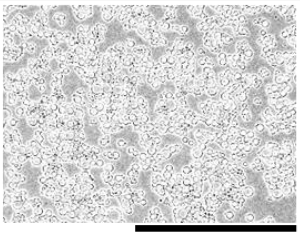
	SOLIEMER®	Conventional Pickering emulsifier	Nonionic surfactant
Amount of emulsifier	+ Good	- poor emulsification	++ Excellent
Stability (50℃/30days)	++ Excellent	- Bad	++ Excellent
Images of emulsions			
Sensory in use	Good sliding	Creakiness	Sticky

Figure 3: Comparison of emulsifier performance
(Contains 20% mineral oil. (The droplet in the image is the emulsified oil component)
Recommended emulsification method: After dispersing "SOLIEMAR® " in an alkaline polyol solution, add oil and thickener, and adjust pH to 5-7 with a pH adjuster.

About Sanyo Chemical

Sanyo Chemical established in 1949 in Kyoto, Japan, is a global manufacturer and seller of performance chemicals. Beginning as a manufacture of soap and texture agents we have since diversified our product portfolio to meet the needs of the market, Today, we feature over 3,000 different types of products and have established an international presence. Our portfolio of chemicals spans a variety of industries and types, from automotive components to daily-use electronics, as well as cosmetics and medical equipment, all with the aim of creating ore safe and environmentally friendlier offerings, improving lives and societies across the world. We aim to contribute to realize a sustainable society through our corporate activities.
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