

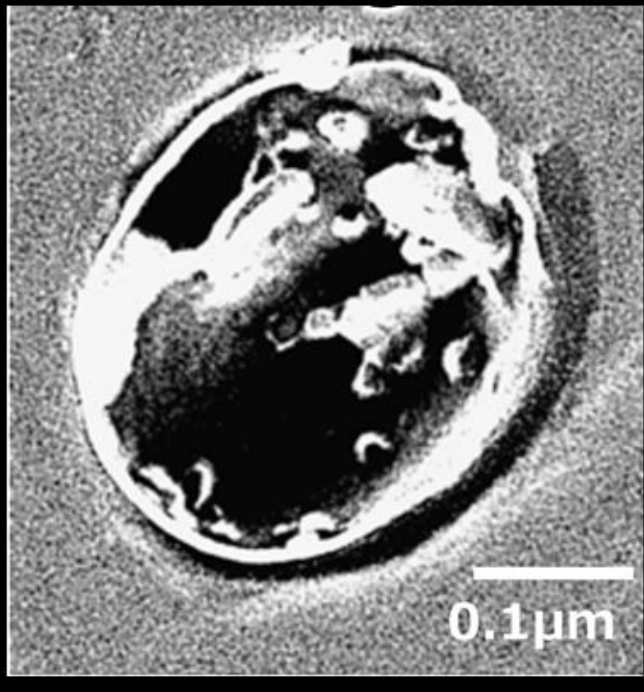
Capsules Containing a UV Scattering Agent

A sunscreen technology that prevents UV penetration by forming a uniform coating with no micrometer level gaps. Microcapsules containing a UV scattering agent fill even the skin's fine unevenness without leaving gaps, creating a "gap-free, uniform UV-protection film." It also provides strong resistance to water, sweat, and friction.

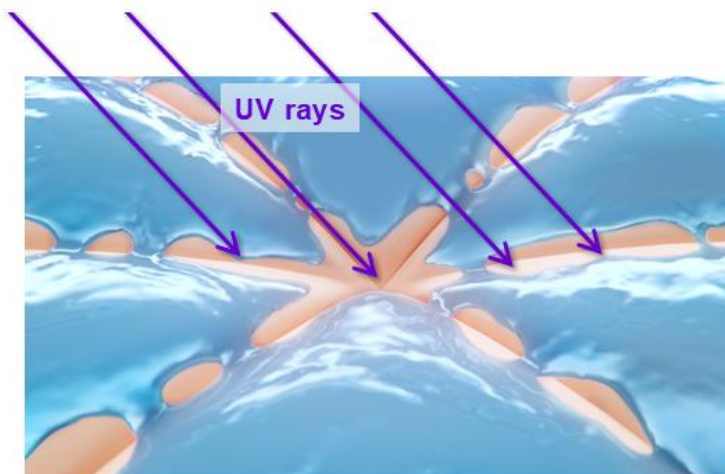
<Unique Points>

Microscopic capsules with a particle size of approximately $0.2\text{ }\mu\text{m}$, encasing UV protectants, were prepared. (μm : one-thousandth of a millimeter.)

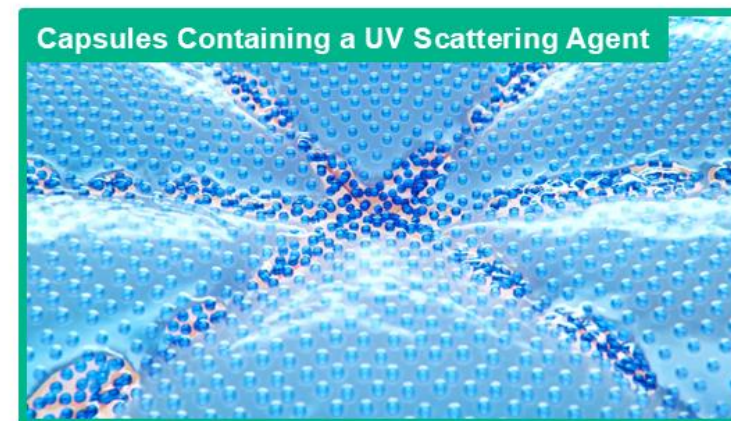
Capsules Containing a UV Scattering Agent



By filling the gaps that form as water in the formulation evaporates with microcapsules, it creates a gap-free film at the micron scale. When incorporated into a water-based formula with a pleasant-to-use, it achieves both a comfortable, non-sticky application and high UV protection.



**Water evaporation creates
micrometer-sized gaps**



**Even after evaporation,
capsules encasing a UV scattering agent
remain in these gaps**

Capsules Containing a UV Scattering Agent

<Key Benefits>

- Enhances the UV protective performance of the film by filling even micrometer-sized gaps.
- Delivers both a comfortable, non-sticky feel and high UV protection.

<Link to Other Contents>

- Research & Development News Release
-Developed the world's first* sunscreen formulation containing capsules encasing UV Protectants. (Japanese only)
<https://www.kao.com/jp/newsroom/news/release/2018/20181029-001/>

- Kao Outer Skin Lab
The key to achieving the world's first* sunscreen that can be applied evenly at the micron scale was the successful development of a "Google Maps of the skin." (Japanese only)

01 Single-Minded Pursuit

https://outerskin.jp/lab/professional_fukui_1.html

02 Ups and Downs

https://outerskin.jp/lab/professional_fukui_2.html

03 Relentless Challenge

https://outerskin.jp/lab/professional_fukui_3.html

*Using our proprietary manufacturing process, this sunscreen formulation incorporates "capsules encasing UV protectants" made of amphiphilic ingredients (compatible with both water and oil), including glyceryl behenate and distearoyl sorbitan. (based on prior-art research and Kao's search of the Mintel Japan database as of July 2018).

<Concerned Research Areas>

- Product Development Research: Skin Care <https://www.kao.com/global/en/innovation/research-development/product-development/skin-care/>
- Fundamental Research:
 - Material Science <https://www.kao.com/global/en/innovation/research-development/fundamental/material-science/>
 - Production Technology <https://www.kao.com/global/en/innovation/research-development/fundamental/production-technology/>
 - Analytical Science <https://www.kao.com/global/en/innovation/research-development/fundamental/analytical-science/>