RESIFA™ SOLESPHERE™ Microsphere Silica Gels for Cosmetic and Skincare Formulations

AGC

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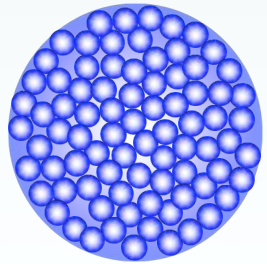
Benefits of RESIFA™ SOLESPHERE™ Gels

Benefits for cosmetics and skincare formulations are based on:

PARTICLE SIZE and **PORE VOLUME**



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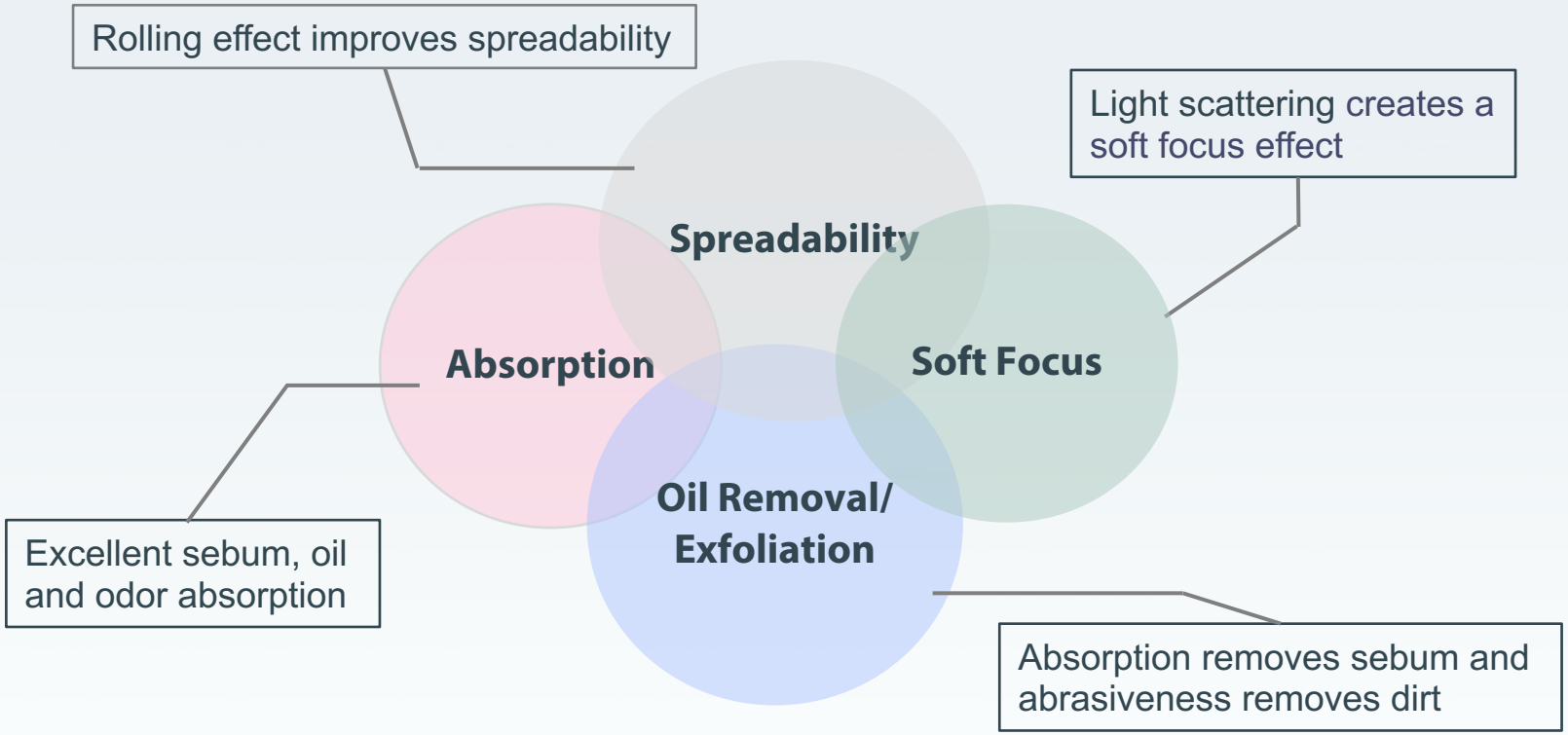
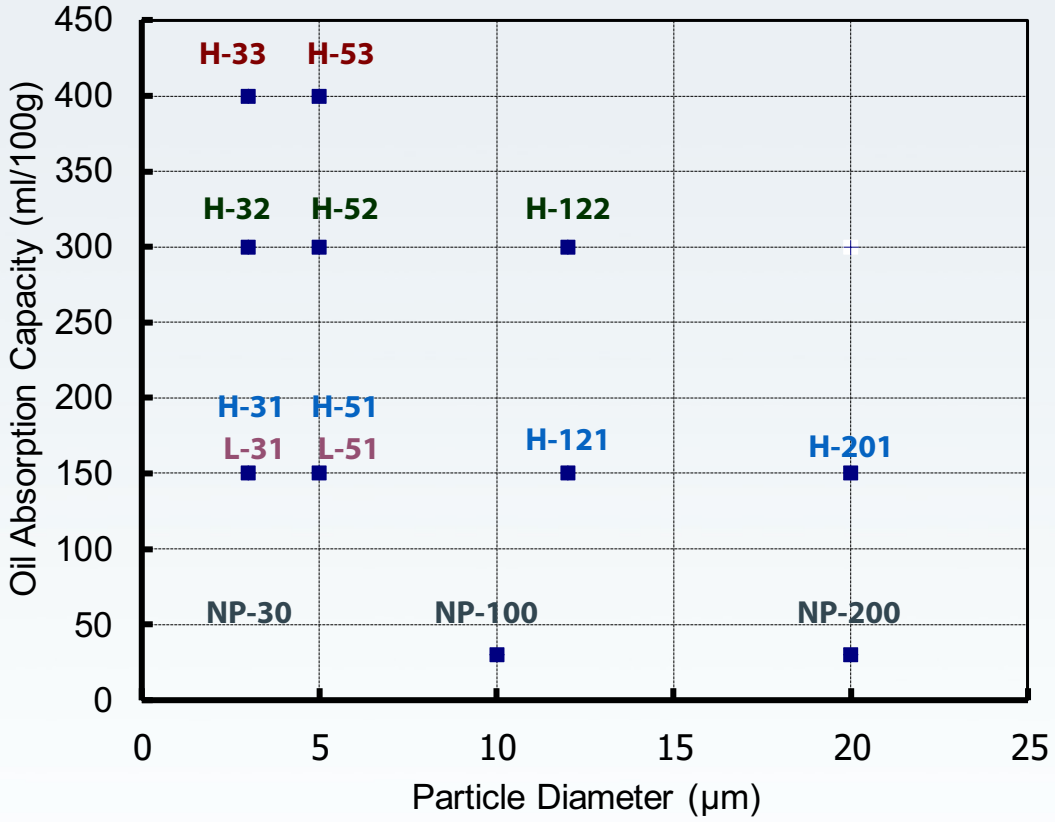
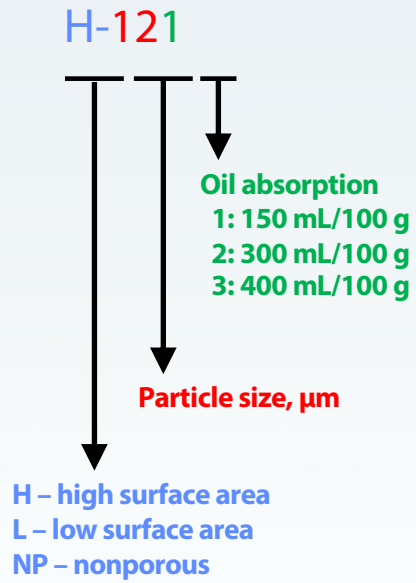
SOLESPHERE Benefits Overview



The SOLESPHERE Product Family





Spreadability

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Factors Affecting Spreadability

HARDNESS

- Silica is a very hard material, and it is difficult to deform like plastic bead fillers.
- Silica has less slip resistance and friction than plastic bead fillers.

SHAPE

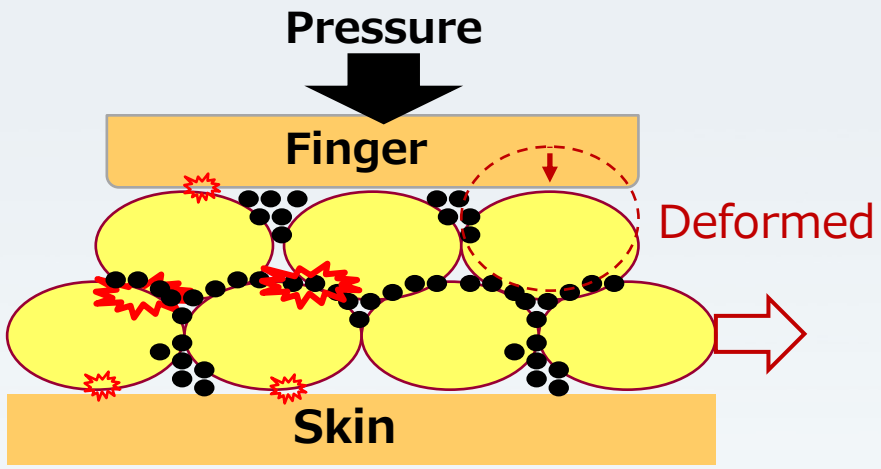
- The more spherical the particle shape, the better the slip and feel.

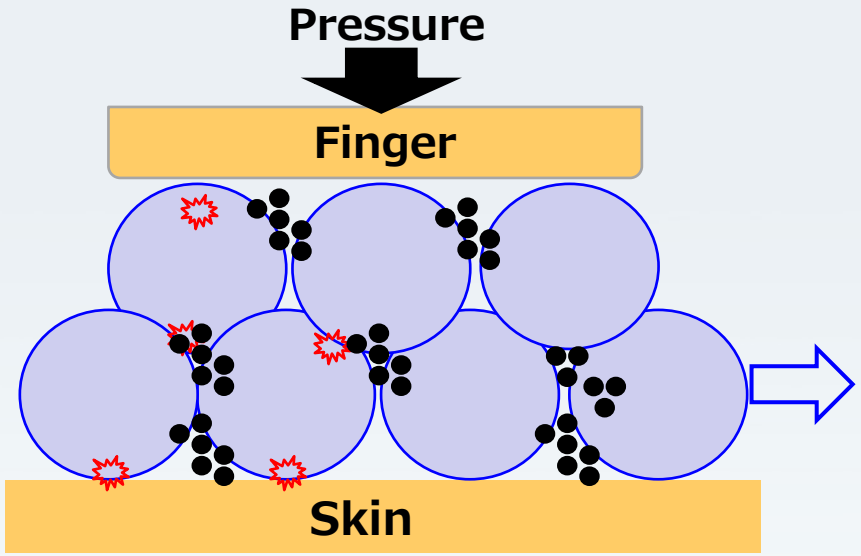
SPECIFIC GRAVITY

- The lower the specific gravity, the easier it is to spread.

These factors affect slip properties far more than surface smoothness.

Soft Touch Feel of SOLESPHERE vs. Plastic Beads





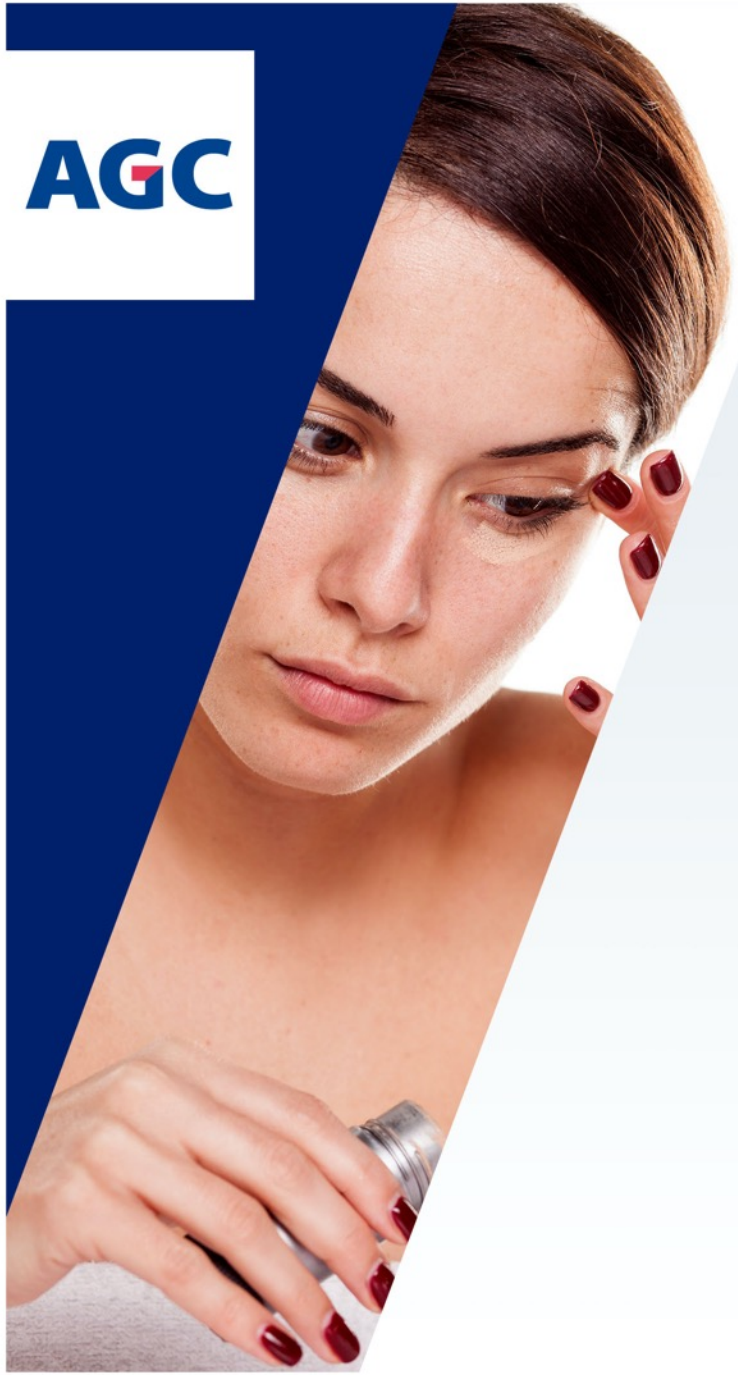
PLASTIC BEADS

- Plastic beads are soft, so they can deform when touched.
- This increases the contact and frictional force between the beads.

SOLESPHERE MICROSPHERES

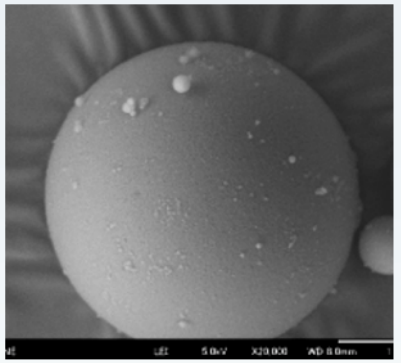
- Silica beads are hard and do not deform. They are spherical, which improves rolling.

● = Nano-sized particles (ZnO, etc.)

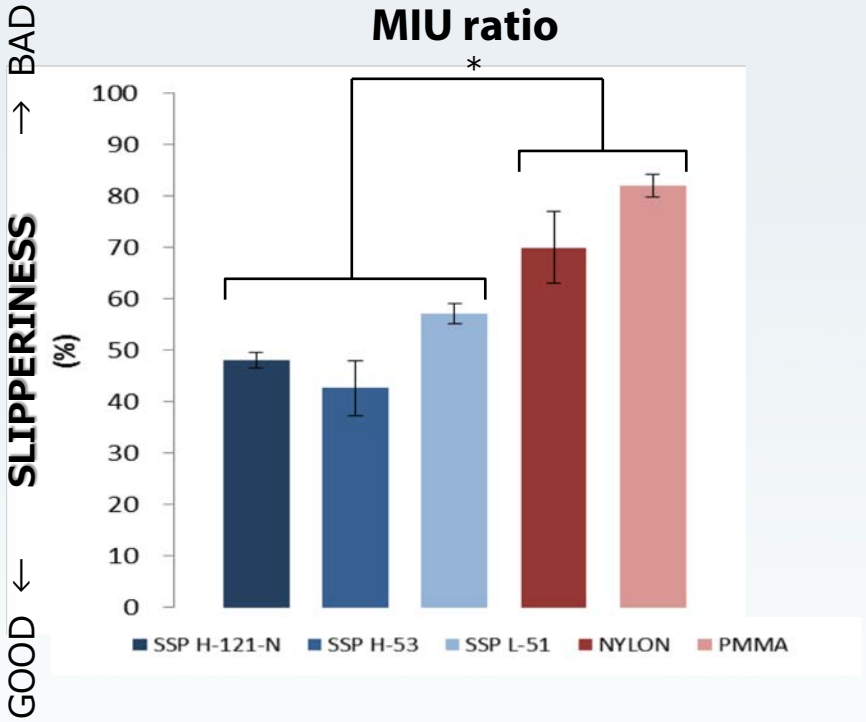


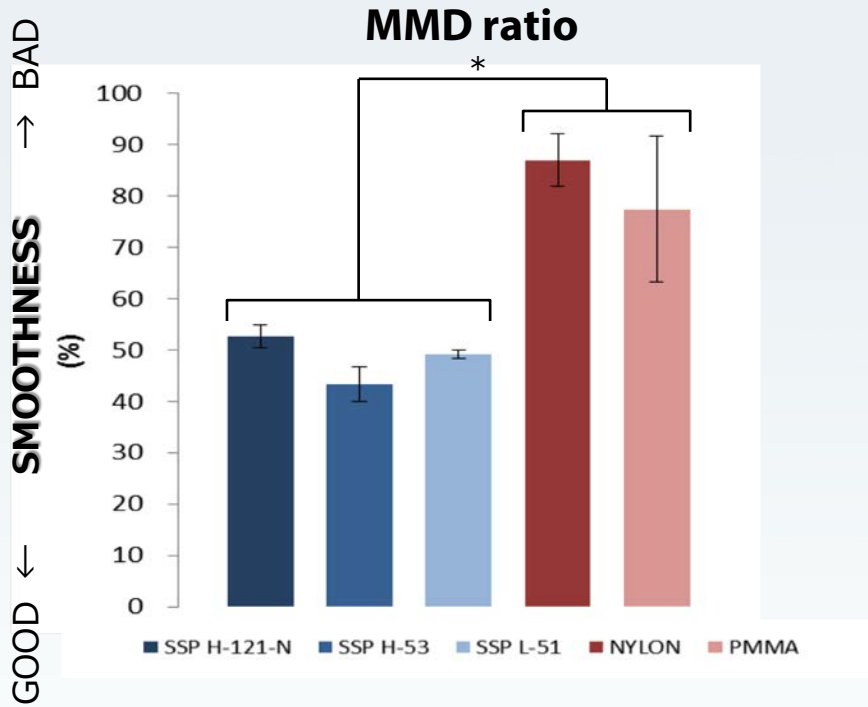
Spreadability

- SOLESPHERE silica microspheres roll easily.
- Rolling effect minimizes friction.
- Low friction increases elongation and improves touch and spreadability.



Comparison with Plastic Bead Fillers





application quantity 2.0 mg/cm^2

t-test $*P < 0.05$

SOLESPHERE provides higher slipperiness and smoothness.

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Soft Focus Effect

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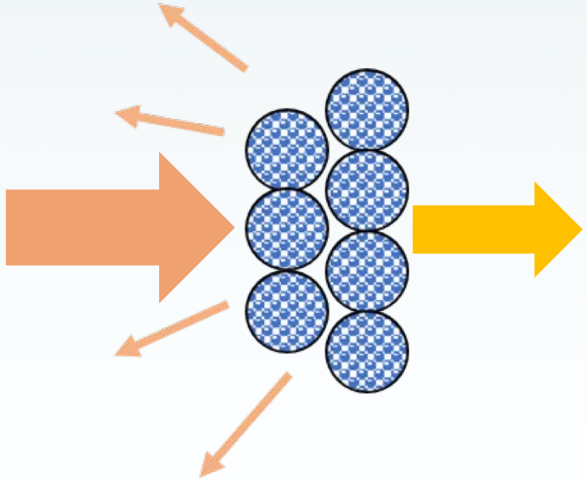
What is Soft Focus?

- The scattering of light caused by a particle's porosity provides a soft focus effect.
- This property effectively hides wrinkles, producing an antiaging effect.



Principle of Soft Focus

Full Transmitted Light

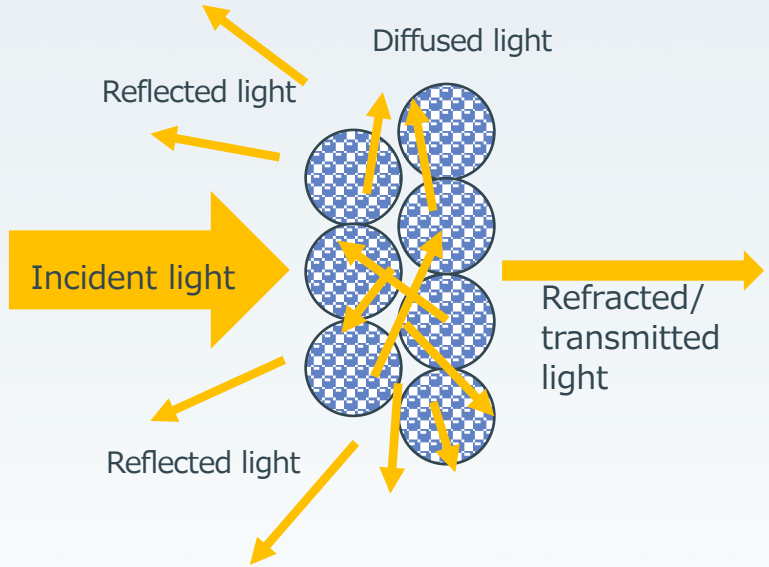
Full transmitted light = diffused light + parallel transmitted light

Full Light Transmission Rate

Full light transmission rate = refracted light / (diffused light + parallel transmitted light)

Haze

Haze = diffusion transmittance / full light transmittance



Factors That Affect Soft Focus

PARTICLE SIZE

The smaller the particle size, the greater the light scatter

SHAPE

The greater the aspherical shape, the better the light scatter

SPECIFIC GRAVITY

The lower the specific gravity, the easier to spread and the higher the light scatter.

POROSITY

The higher the porosity, the better.

SOLESPHERE is an ideal choice for soft focus.

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Differences in Soft Focus Due to Lighting

FULL LIGHT TRANSMISSION RATE

High transmission rate → High transparency

Low transmission rate → Low transparency and whitish finish

HAZE

High haze → High soft focus and a higher effect of hiding wrinkles

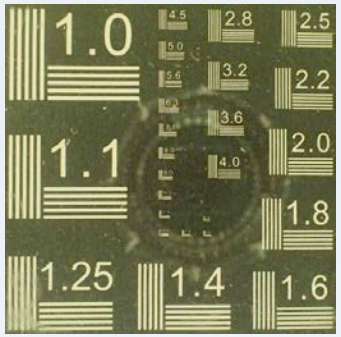
Low haze → No soft focus and not as effective at hiding wrinkles

High light transmittance and high haze causes the most effective wrinkle-concealing effect.

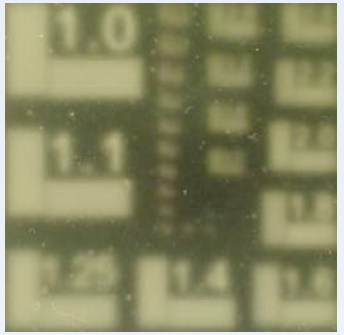
Testing Soft Focus

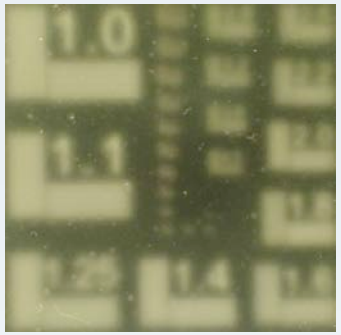
Test procedure

- Each powder and KF-7312J was dispersed at a ratio of 1:9
- Coating film was prepared:
  - Coating at 90 seconds at 50 °C
  - Spin coated at 500 rpm for 90 seconds
  - Dried for 30 minutes

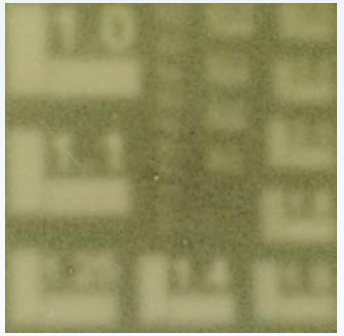


Control


SOLESPHERE H-51


SOLESPHERE H-53

SOLESPHERE L-51


SOLESPHERE H-121

Sebum, Oil and Odor Absorption

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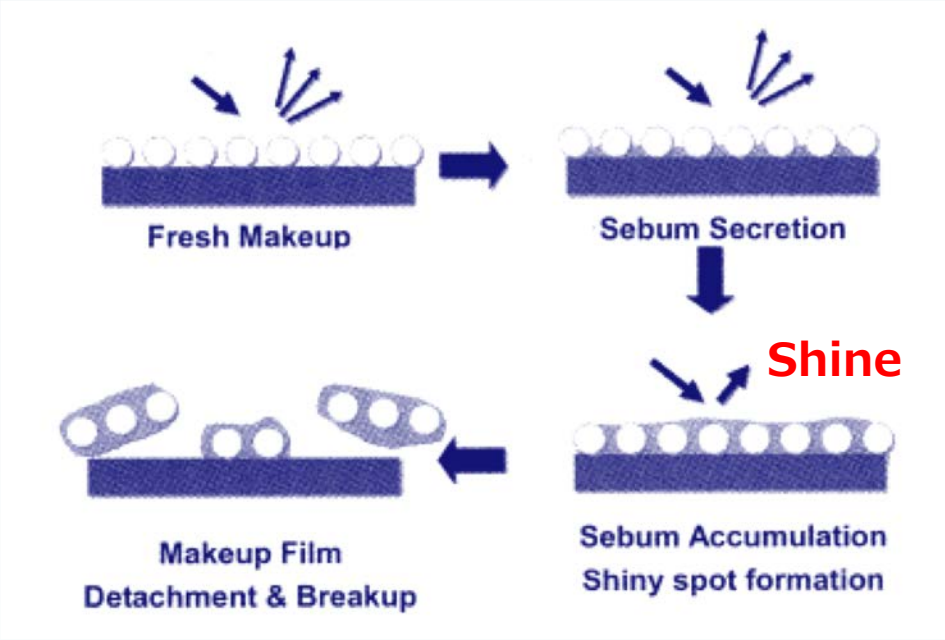
Influence of Sebum on Cosmetics



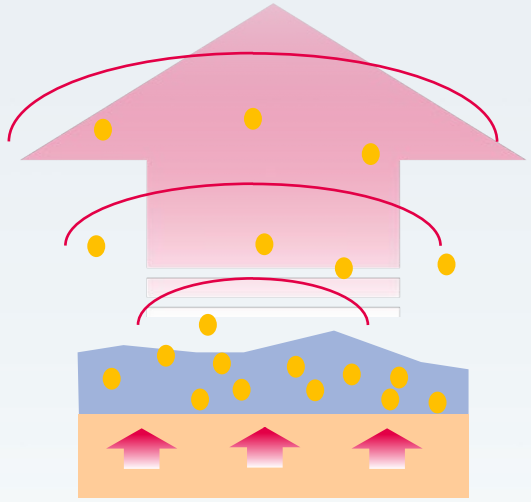
As sebum secretion accumulates, two things happen:

1. Light reflection is reduced and shiny spots form
2. Too much sebum causes makeup to collapse/break up

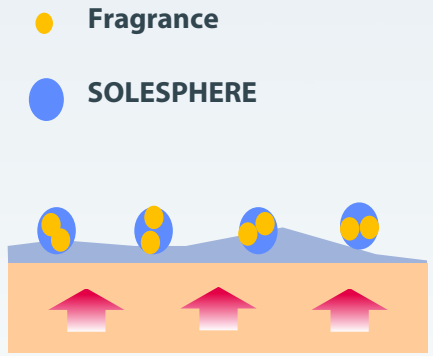
Sebum secretion causes shiny spots and makeup deterioration.

Absorbing Sebum and Oil

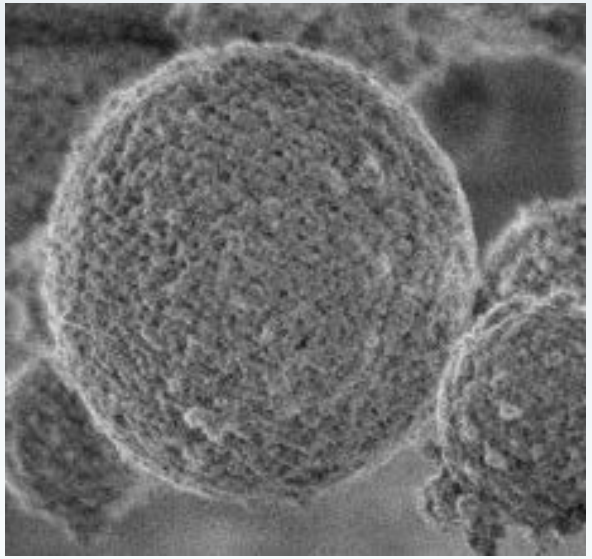
Fragrance released



Without SOLESPHERE, the fragrance is released and does not stay on skin.



With SOLESPHERE, the fragrance stays on the skin surface longer and absorbs sebum



SOLESPHERE gel particles capture sebum, oil and fragrances in their pores.

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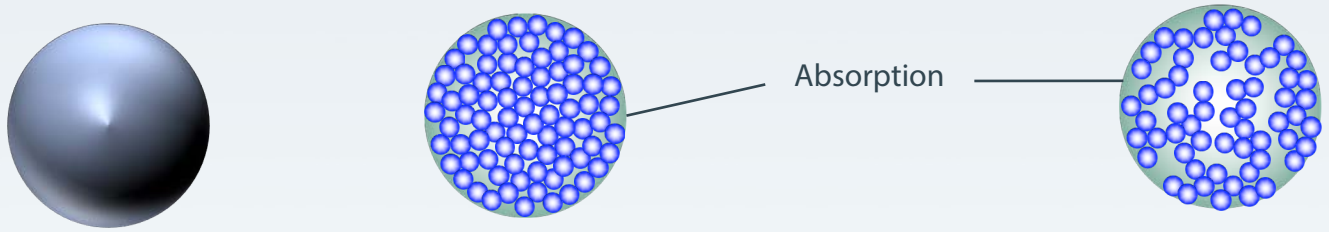
Absorbing Sebum and Oil

The larger the pores, the more sebum, oil and odor are absorbed.



NP Series	1 Series	2 Series	3 Series
NP-30	**H-31**	H-32	H-33
NP-100	**L-31**	H-52	H-53
NP-200	**H-51**	H-122	H-122
	H-121		
	H-201		

LOWER ABSORPTION **HIGHER ABSORPTION**

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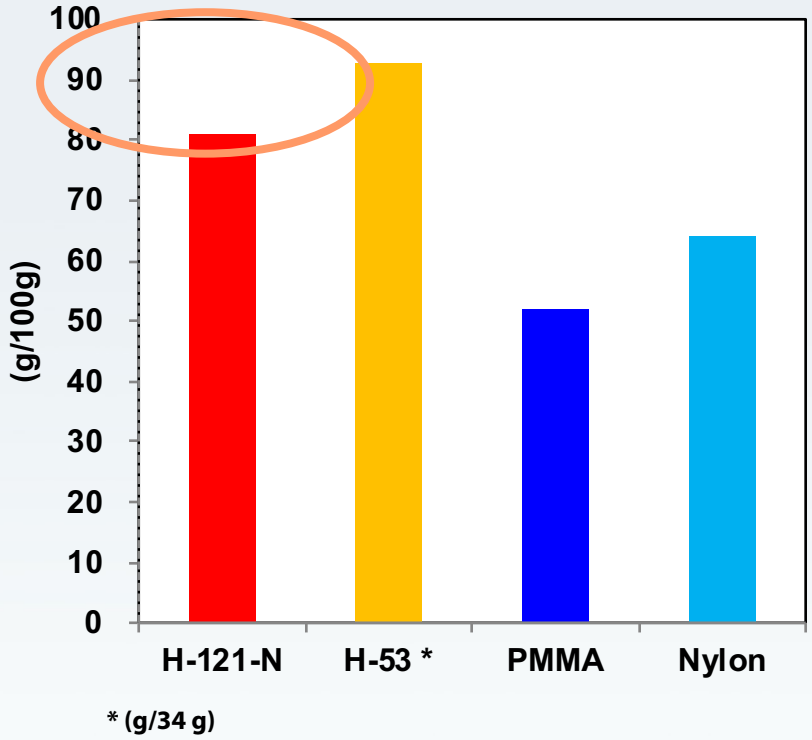
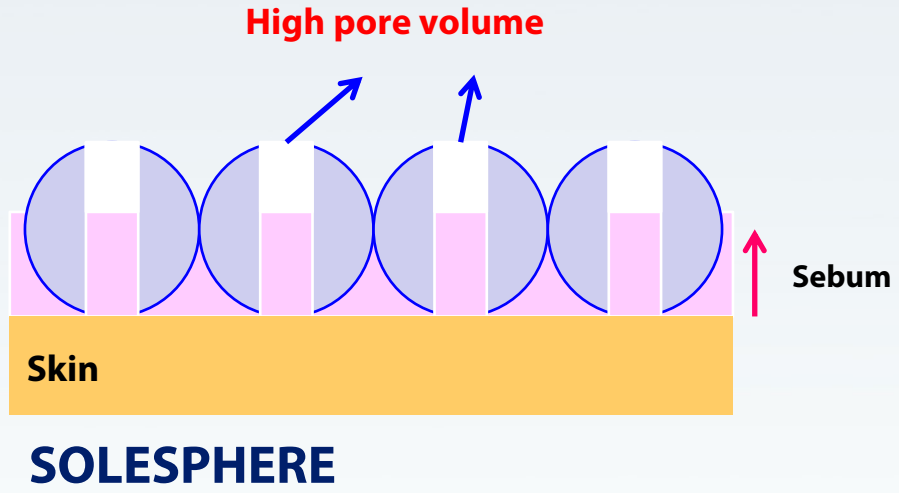
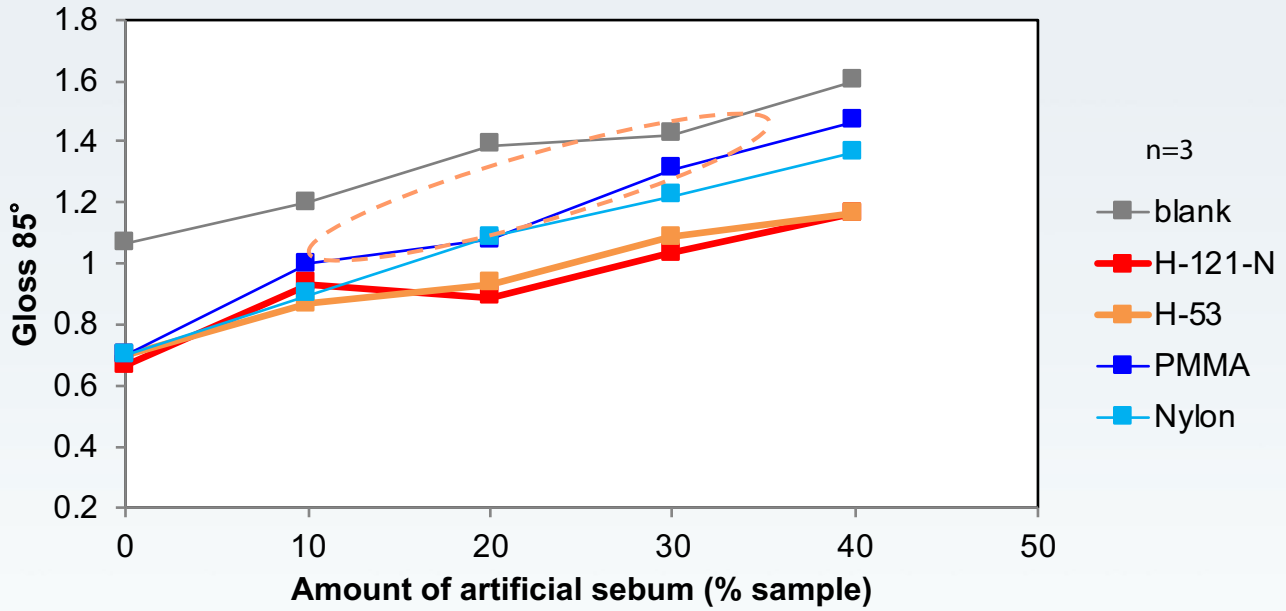
SOLESPHERE Absorbs Sebum





SOLESPHERE's high pore volume can absorb considerable sebum, which prevents shine and helps makeup last longer.

Results of Sebum Absorption Test with Glossmeter



When compared with plastic beads, SOLESPHERE microspheres better prevented shiny spots from forming.

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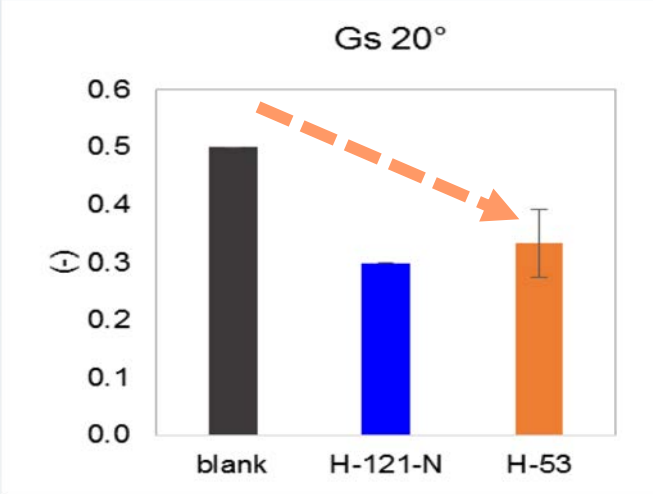
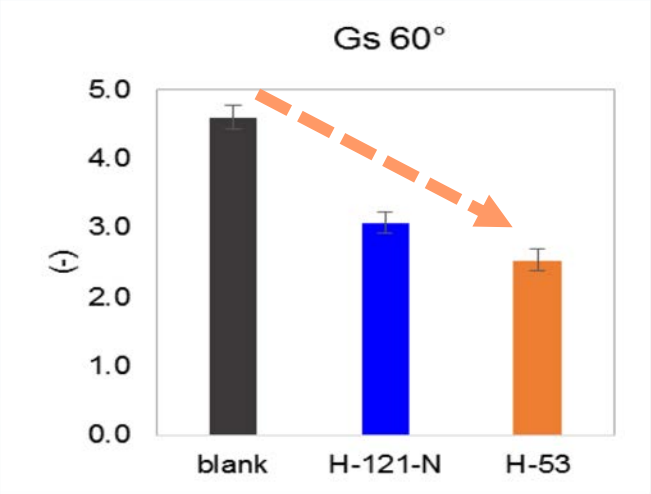
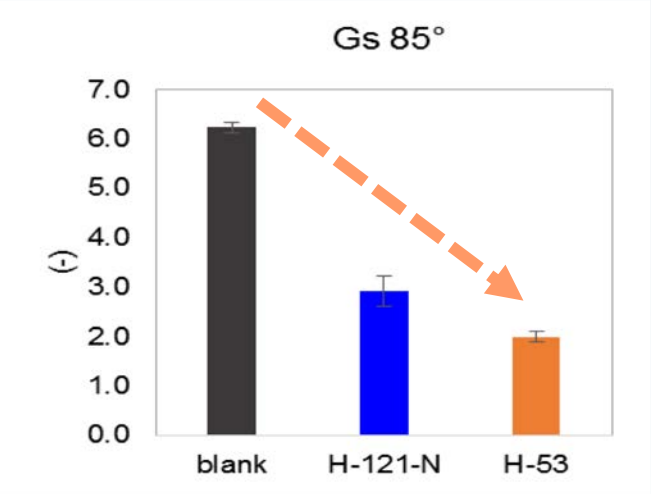
Results of Gloss and Matte Effect Testing







- **Adding SOLESPHERE to a formulation decreases its glossiness.**
- **SOLESPHERE can provide a matte effect for cosmetic formulations.**

Exfoliation Properties

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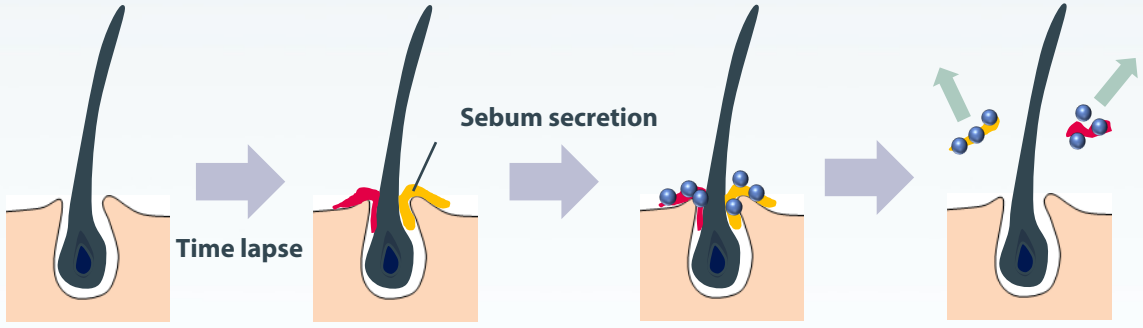
Oil Removal/Dirt Scrub

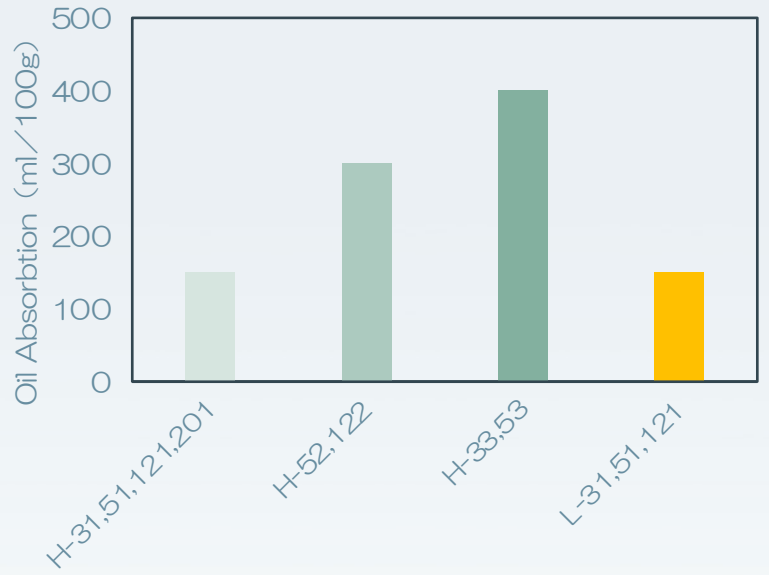
- SOLESPHERE effectively absorbs sebum and oil.
- SOLESPHERE effectively removes dirt with abrasion.



Immediately after washing

SOLESPHERE absorbs sebum

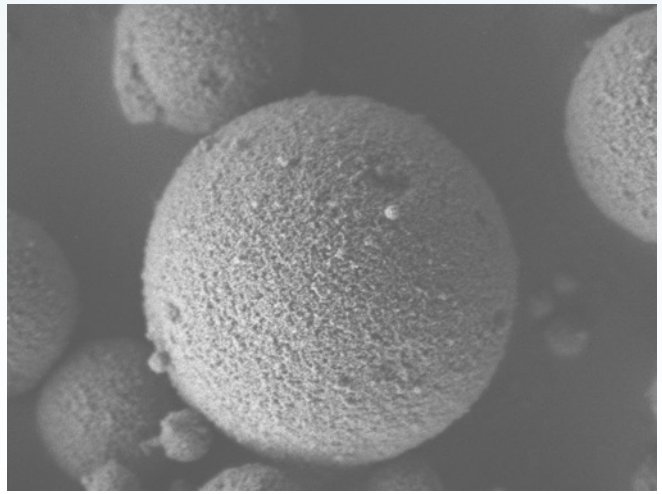
Sebum is washed off

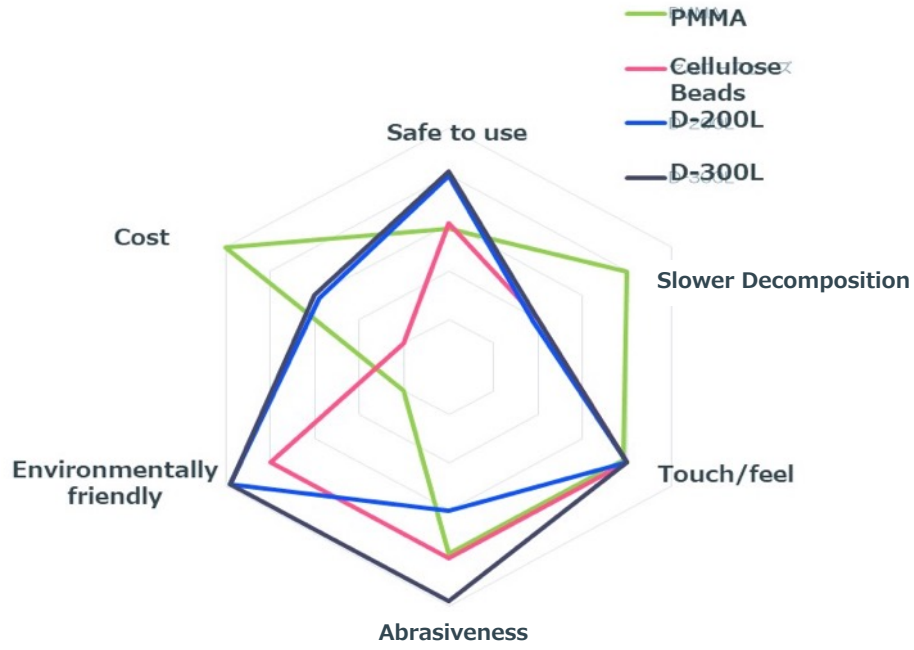


Advantages of Using SOLESPHERE Silica Scrub

- Environmentally friendly
- Safe to use
- Good replacement for plastic bead fillers

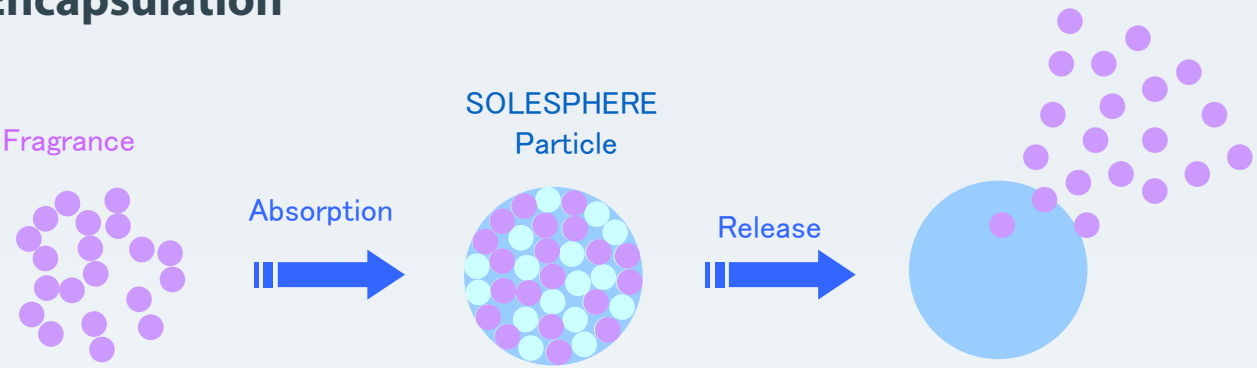
Concentration 1%-3% D-200L, 300L



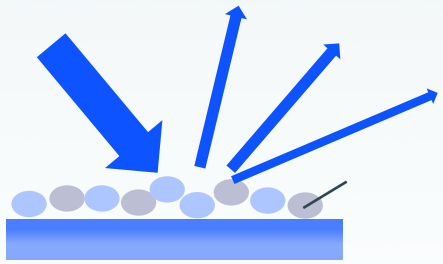


Encapsulation and Matte Effects

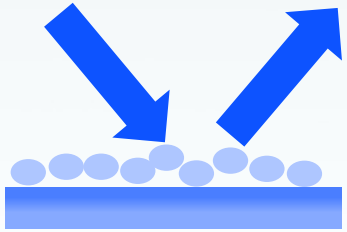
Encapsulation



Matte effect



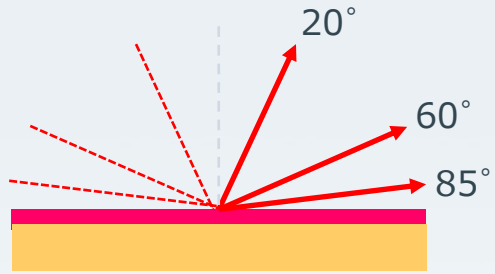
Formulation with SOLESPHERE gel



Formulation without SOLESPHERE gel

Testing Matte Effect

- A 1 mg/cm^2 lipstick formulation sample was applied to a BIOSKIN plate.
- Density = 1.0 mg/cm^2
- Thickness: 10 µm*
- PG-1M glossmeter** measured shine at 20°, 60° and 85° angles.



*General thickness of lipstick film: 8~20 µm, Ref.: J. Soc. Cosmet. Chem. Japan, 37 (2003) 17-24.
**Nippon Denshoku Industries Co., Ltd.

Conclusions

- SOLESPHERE gels improve smooth feel, application and spreadability of skin care formulations.
- SOLESPHERE gels impart a soft focus effect.
- SOLESPHERE gels absorb sebum, oil and odor.
- SOLESPHERE gels can be used to enable exfoliation, impart matte effects and encapsulate fragrances.

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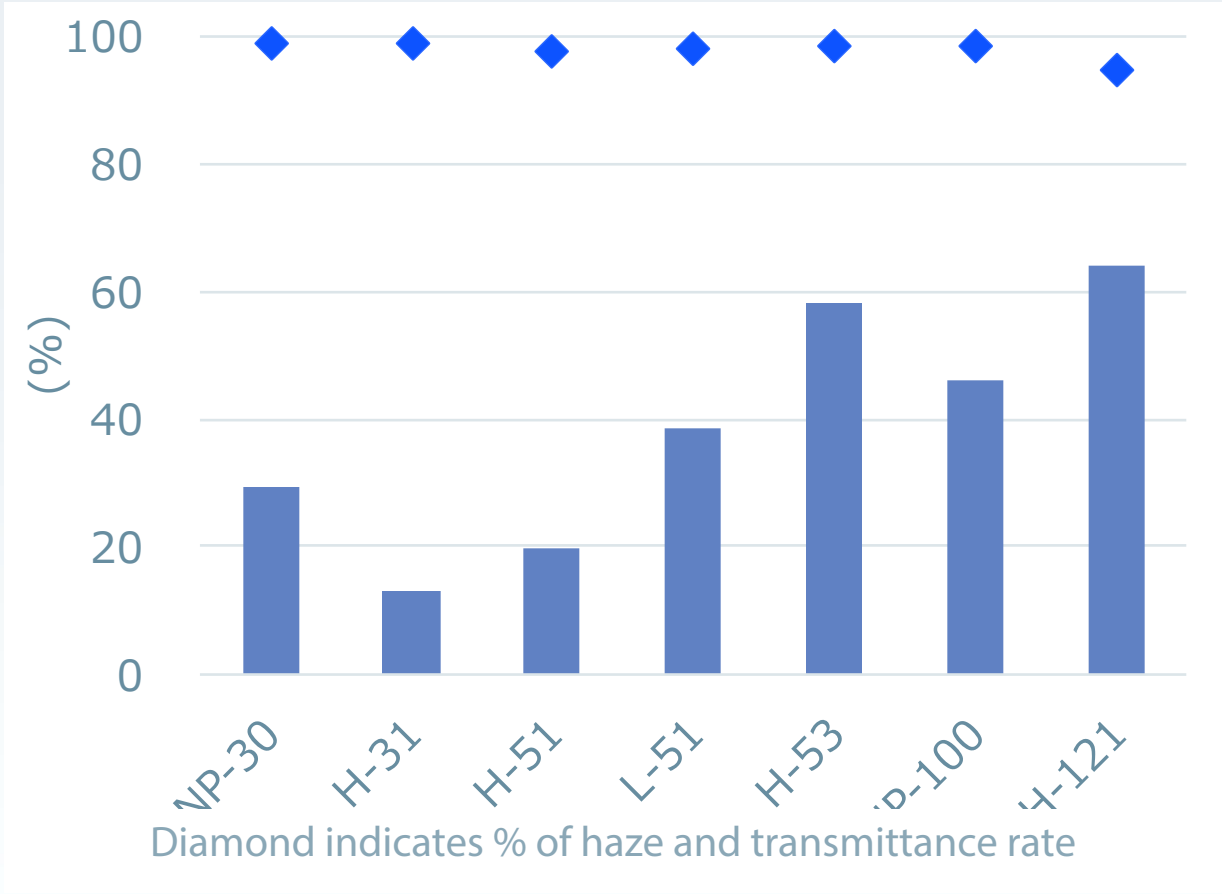
Haze and Total Transmittance of SOLESPHERE Grades



Diamond indicates % of haze and transmittance rate

The higher the particle size, higher the blur effect and the amount of oil absorption.

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