








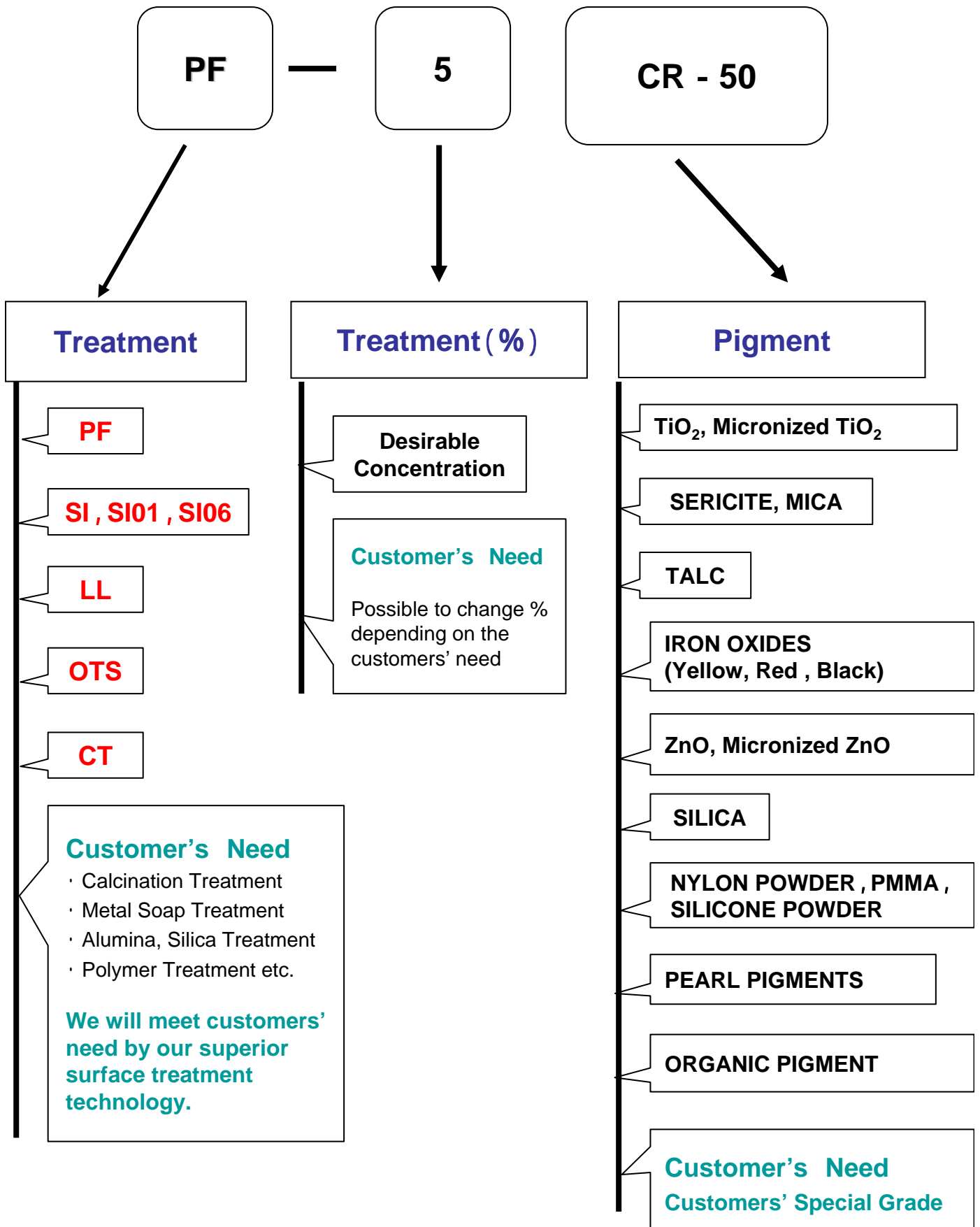


Surface Treatments

List of Surface Treatment

Surface Treatment	INCI Name	Characteristics	Remarks
Hydrophobic & Lipophobic Treatment – Long Lasting -			
PF	C9-15 FLUOROALCOHOL PHOSPHATE	Powdery Feeling	 EPF (Environmental PF)
FHS	PERFLUOROOCYLTTRIETHOXSILANE	Smooth Feeling	
FOTS	C9-15 FLUOROALCOHOL PHOSPHATE, TRIETHOXYCAPRYLSILANE	Creamy Feeling, Easy to formulate FOTS-22  For Liquid Products	Hybrid (PF+OTS)
FS01	C9-15 FLUOROALCOHOL PHOSPHATE, DIMETHICONE/METHICONE COPOLYMER	Powdery Feeling Easy to formulate	Hybrid (PF+SI01)
FSA	C9-15 FLUOROALCOHOL PHOSPHATE, ACRYLATES/DIMETHICONE COPOLYMER	Easy to formulate Good Adhesiveness to the Skin Low Viscosity Dispersion in Oil	Hybrid (PF+ASC)
FITT	C9-15 FLUOROALCOHOL PHOSPHATE, ISOPROPYL TITANIUM TRIISOSTEARATE	Creamy Feeling Good Adhesiveness to the Skin Low Viscosity Dispersion in Oil	Hybrid (PF+ITT)
Hydrophobic Treatment			
SI	METHICONE	Powdery Feeling Good Dispersability	
SI01	DIMETHICONE/METHICONE COPOLYMER	Powdery Feeling Good Dispersability	Lower H ₂ Potential
SI06	DIMETHICONE	Powdery Feeling Good Dispersability	Zero H ₂ Potential
ASC	ACRYLATES/DIMETHICONE COPOLYMER	Unique Water Proof O/W Formula Good Adhesiveness to the Skin	
OTS	TRIETHOXYCAPRYLSILANE	Creamy Feeling Good Adhesiveness to the Skin	
ITT	ISOPROPYL TITANIUM TRIISOSTEARATE	Creamy Feeling Good Adhesiveness to the Skin	Licensed by KOBO
Amino Acid Treatment			
ASL 	SODIUM DILAURAMIDOGLUTAMIDO LYSINE	Novel W/O Whipped Formula without Surfactant	
LL	LAUROYL LYSINE	Smooth Feeling Excellent Spreadability	
ASI	SODIUM LAUROYL ASPARTATE ZINC CHLORIDE ISOPROPYL TITANIUM TRIISOSTEARATE	Smooth Feeling Uniform Adhesion to the Skin Weak Acid pH (5-6)	
Hydrophilic Treatment			
CT	CHITOSAN	Moisturizing	
PGS	METHOXY PEG-10 PROPYLTRIMETHOXSILANE	Good Dispersability in Water	
By Spray Dry Method			
C2	MICROCRYSTALLINE CELLULOSE	Moisturizing, Hydrophilic Good Dispersability in Water	
FC2 	C9-15 FLUOROALCOHOL PHOSPHATE, MICROCRYSTALLINE CELLULOSE	Water and Oil Proof Excellent Smoothness	Hybrid (PF+C2)
APD	ACRYLATES COPOLYMER	Superior Oil Absorption Sebum Absorption	

The Product Name of DAITO's Surface Treated Pigments

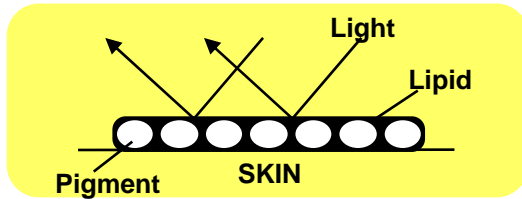


PF Treatment

(Patent : JP1938549, JP25509392)

Mechanism of Formulation of PF Pigments

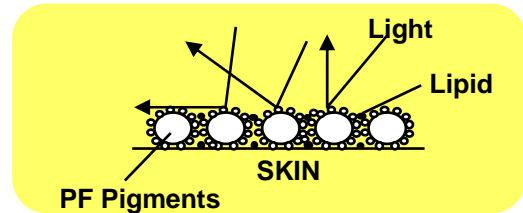
Conventional Make-up Products



Particles of pigments can be compatible with lipid (sebum) from the skin, so it is mixed with lipid, and the layer of lipid on the surface of make-up finishing reflect the light strongly.

(Shiny & Greasy appearance)

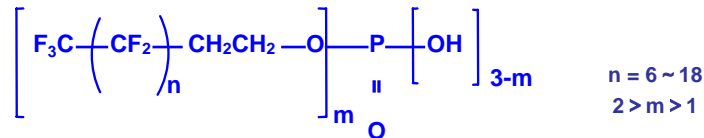
Novel Make-up Products With PF Pigments



PF Pigments are not compatible with lipid, so the natural and powdery appearance can be maintained for a long time.

(Long Lasting Effect)

Chemical Structure of PF Treatment Agent



INCI Name: C9-15 FLUOROALCOHOL PHOSPHATE

Contact Angle (Water)



Non Treated TiO₂

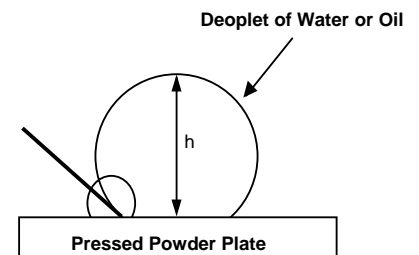
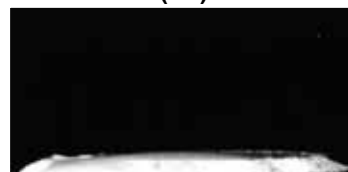


Silicone Treated TiO₂



PF Treated TiO₂

Contact Angle (Oil)

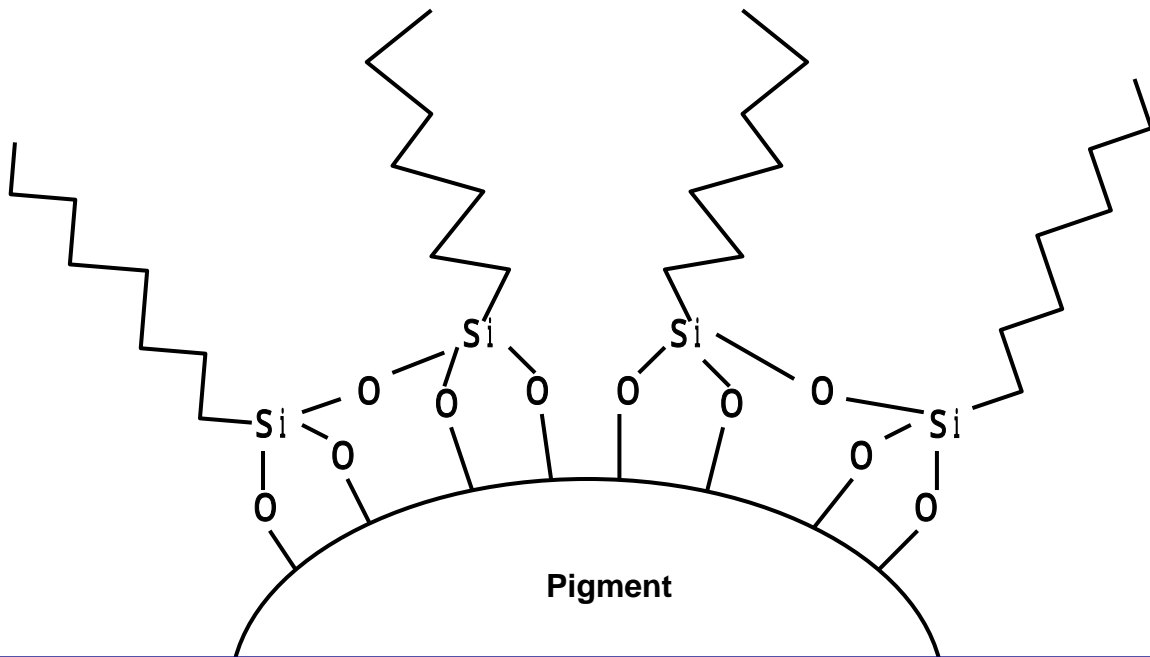


Contact Angle Measurement

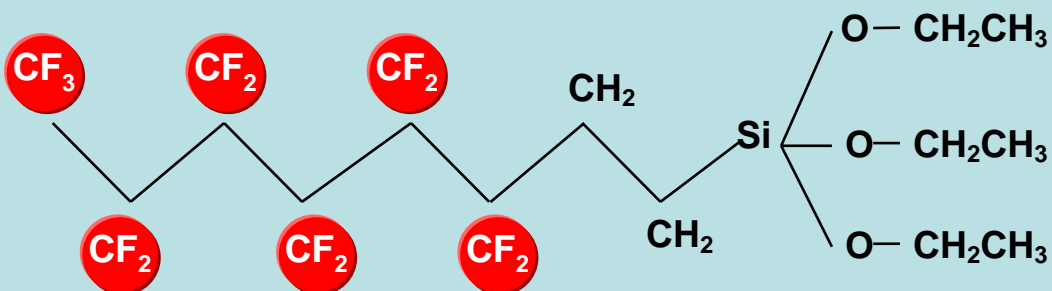
Surface Tension

$$= \frac{gh^2}{2(1-\cos \theta)}$$

FHS Treatment



INCI Name: PERFLUOROCTYL TRIETHOXYSIANE



Water and Oil Repellency of FHS Treated Pigments



FHS Hybrid Treatment

	Treatment (%)	Contact Angle (°)	
		Water	Oil
FHS-3 TiO ₂ CR-50	3.0	152	142
FHS-3 SERICITE FSE	3.0	150	113
FHS-3A TALC JA-46R	3.0	140	85
FHS-3A MICA Y-2300	3.0	145	134
FHS-3 YELLOW LL-100P	3.0	152	150
FHS-3 RED R-516P	3.0	143	123
FHS-3 BLACK BL-100P	3.0	153	138

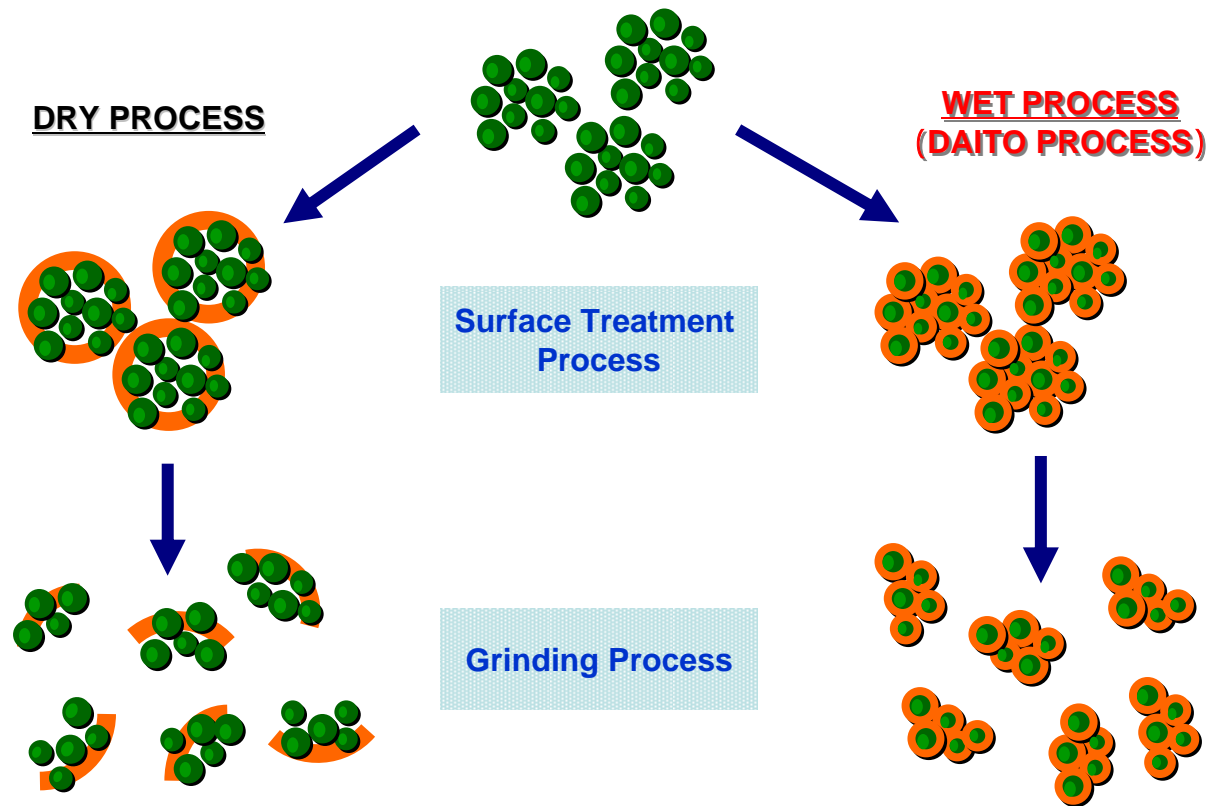
FHTS

: FHS & OTS

FHSA

: FHS & ASC

SI Treatment



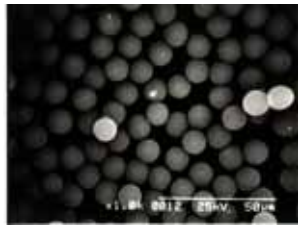
Surface Activity of SI01 Pigment

	Transition Rate (%)		Residual Rate (%)
	To Propylene	To Acetone	IPA
ZnO-350	46.0	52.1	1.9
SI01-4 ZnO-350	0.0	4.6	95.4

Chemical Structure of Various Silicone Treatment

SI	SI01	SI06
METHICONE	DIMETHICONE/METHICONE COPOLYMER	DIMETHICONE
$\text{H}_3\text{C}-\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}-\text{O}-\left(\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{H} \end{matrix}\right)_n-\text{O}-\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}-\text{CH}_3$	$\text{H}_3\text{C}-\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}-\text{O}-\left(\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}\right)_m-\text{O}-\left(\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{H} \end{matrix}\right)_n-\text{O}-\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}-\text{CH}_3$ <p style="text-align: center;">m:n 1:1</p>	$\text{H}_3\text{C}-\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}-\text{O}-\left(\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}\right)_n-\text{O}-\text{Si}\begin{matrix} \text{CH}_3 \\ \\ \text{CH}_3 \end{matrix}-\text{CH}_3$

LL Treatment

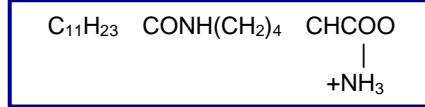


N -Lauroyl-L-Lysine



INCI Name: LAUROYL LYSINE

Conventional Method
(Dry Blending)

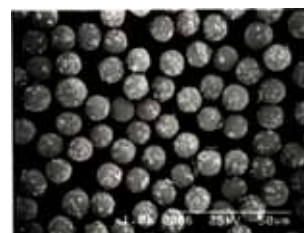


DAITO's Technology
(Water Slurry Reaction)

We can not find LL on the surface of spherical powder.

In this dry blending system, LL crystals does not exist uniformly.

Crystal size is not controlled at all.



Surface of spherical powder is coated by LL.

In this water slurry system, LL crystals exist very uniformly.

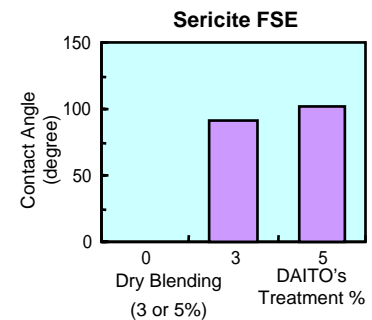
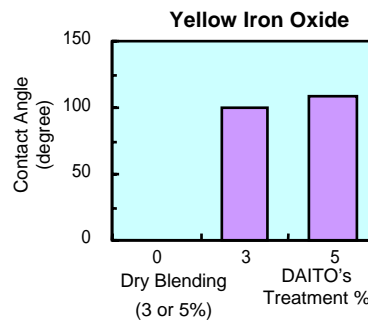
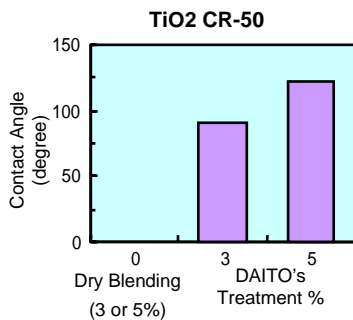
Crystal size of LL is controlled decately



Properties of DAITO's LL Pigments

Water Repellency and Smoothness

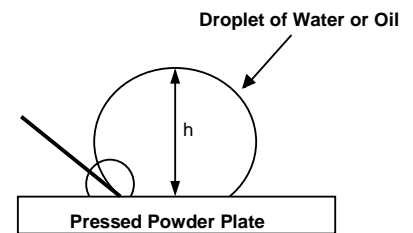
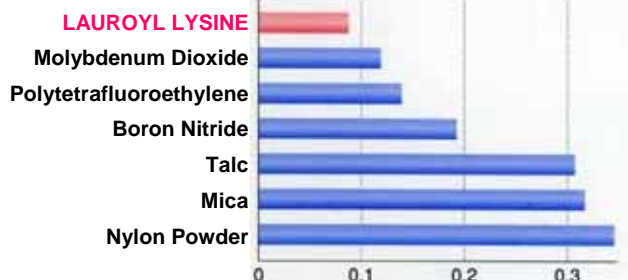
Water Repellency
(Contact Angle)



Friction Factor of Various Powder

Ref. Brochure of Ajinomoto Co., Inc.

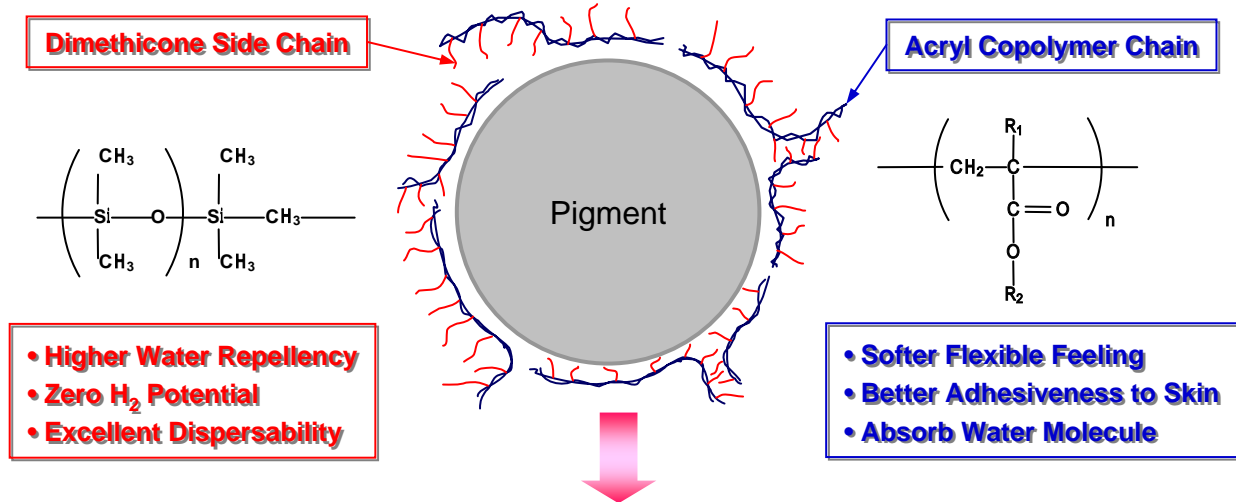
Smoothness



Contact Angle Measurement

ASC Treatment

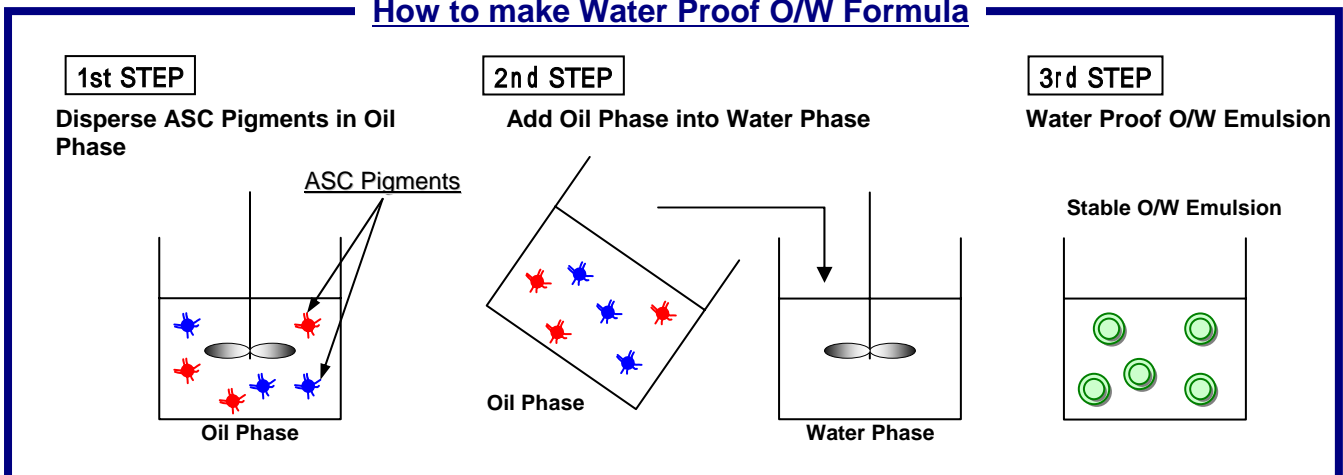
The Image of ASC Pigment and its Properties



Treatment of Both Properties of Acryl Copolymer Chain and Dimethicone Side Chain

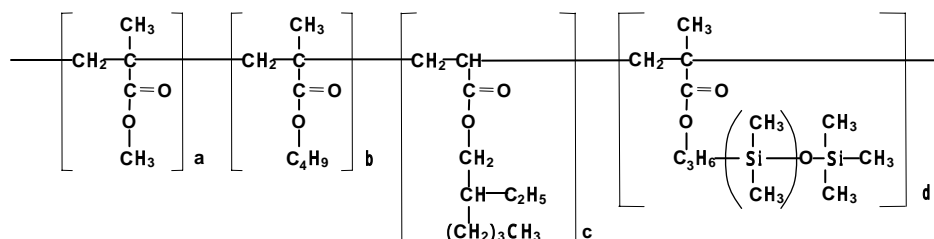
The Novel Water Proof O/W Formula

How to make Water Proof O/W Formula



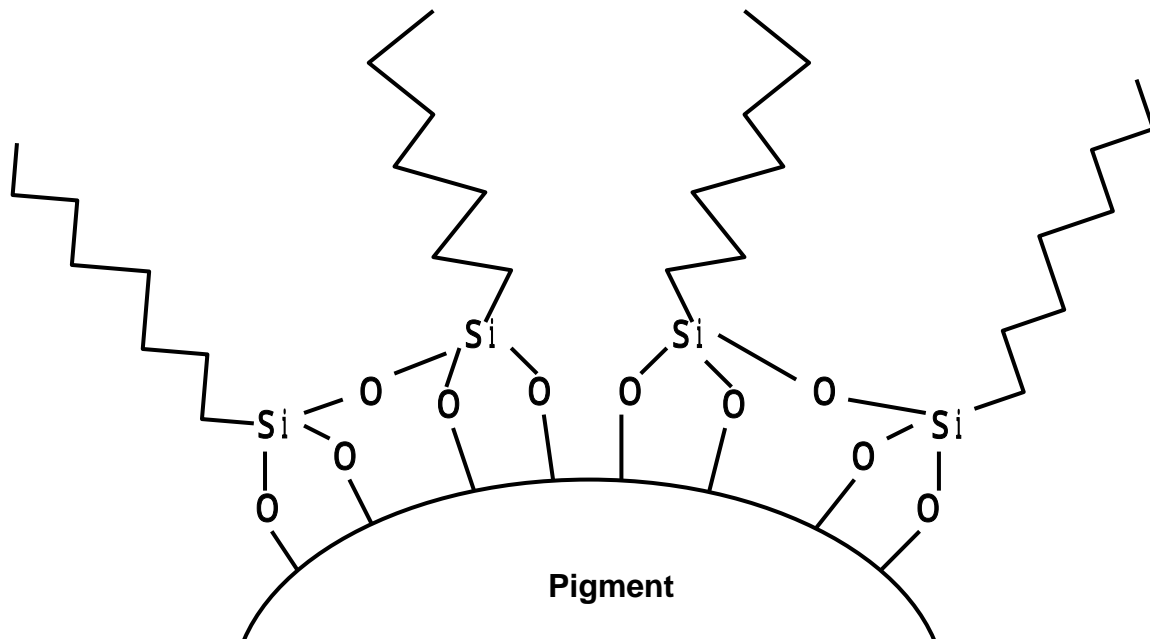
Chemical Structure

INCI Name: ACRYLATES/DIMETHICONE COPOLYMER

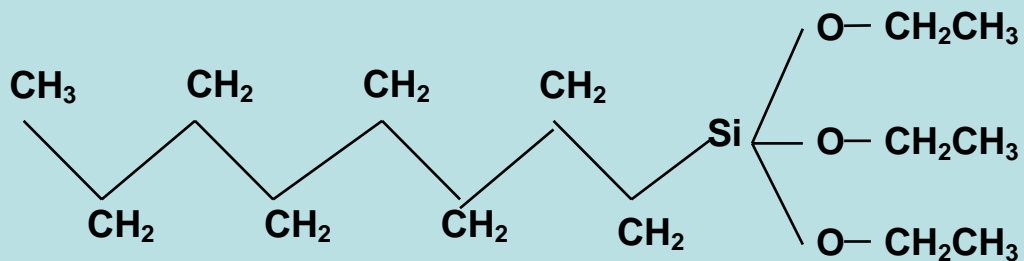


OTS Treatment

n-Octyle Triethoxy Silane Treatment



INCI Name: TRIETHOXYCAPRYLYLSILANE



Water Repellency

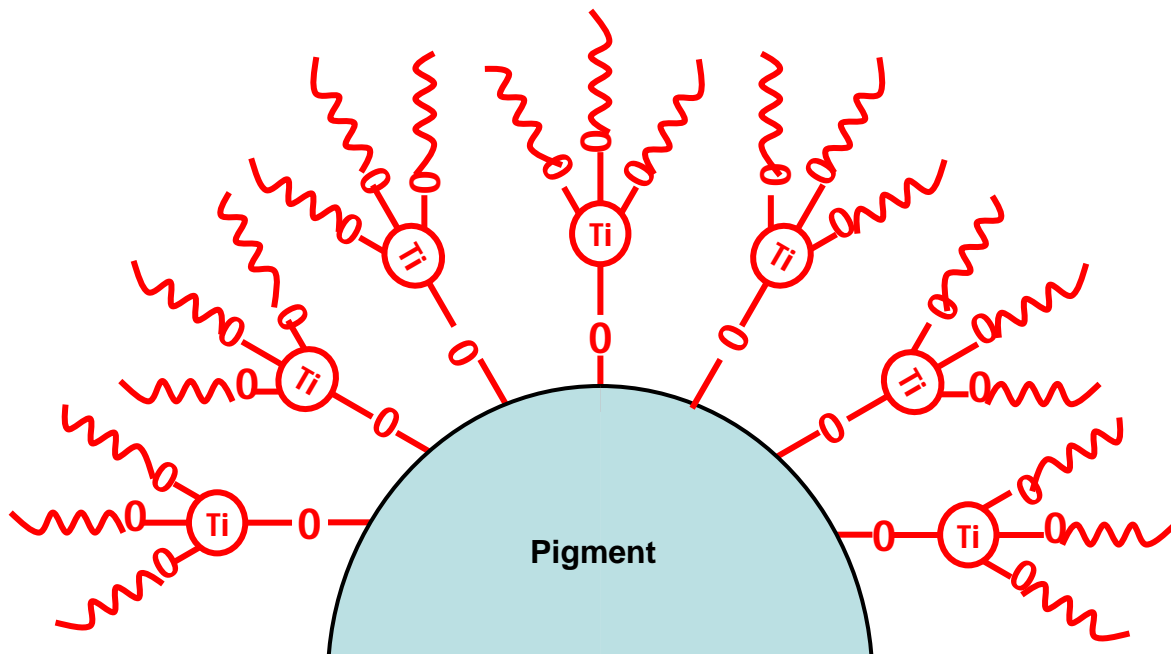
Advantage of OTS Treatment

1. Good Water Repellency
2. Good Dispersability
3. Creamy Feeling
4. Good Extendability

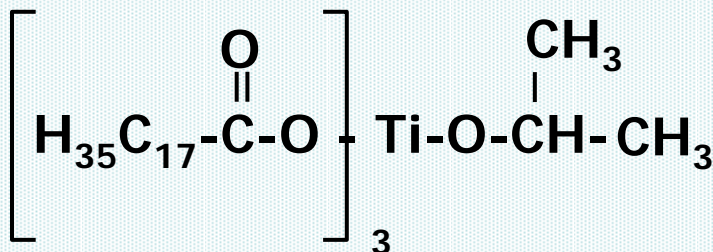
Product Name	Contact Angle (degree)
OTS-2 SERICITE FSE	146
OTS-2 MICA Y-2300	147
OTS-2 TiO2 CR-50	158
OTS-2 TALC JA-46R	132
OTS-2 YELLOW LLXLO	155
OTS-2 RED R-516L	153
OTS-2 BLACK BL-100	159

* Safety Test Results of OTS Pigments are available.

ISOPROPYL TITANIUM TRIISOSTEARATE Treatment



INCI Name : ISOPROPYL TITANIUM TRIISOSTEARATE



Water Repellency

Advantage of ITT Treatment

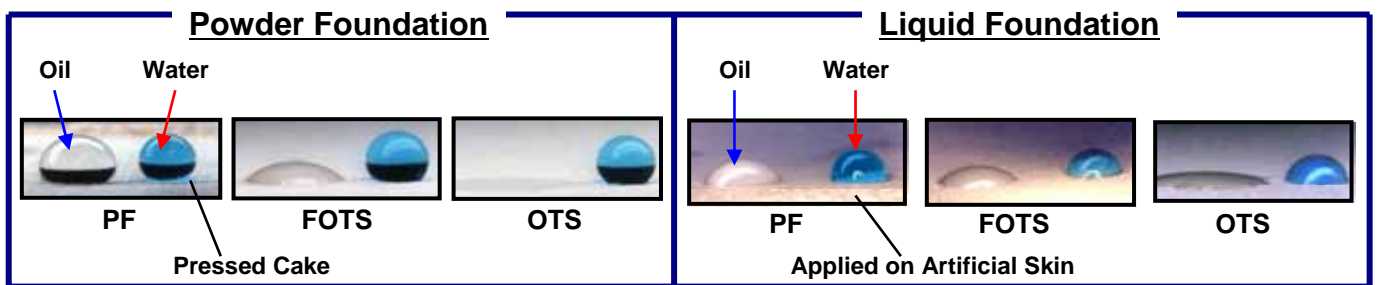
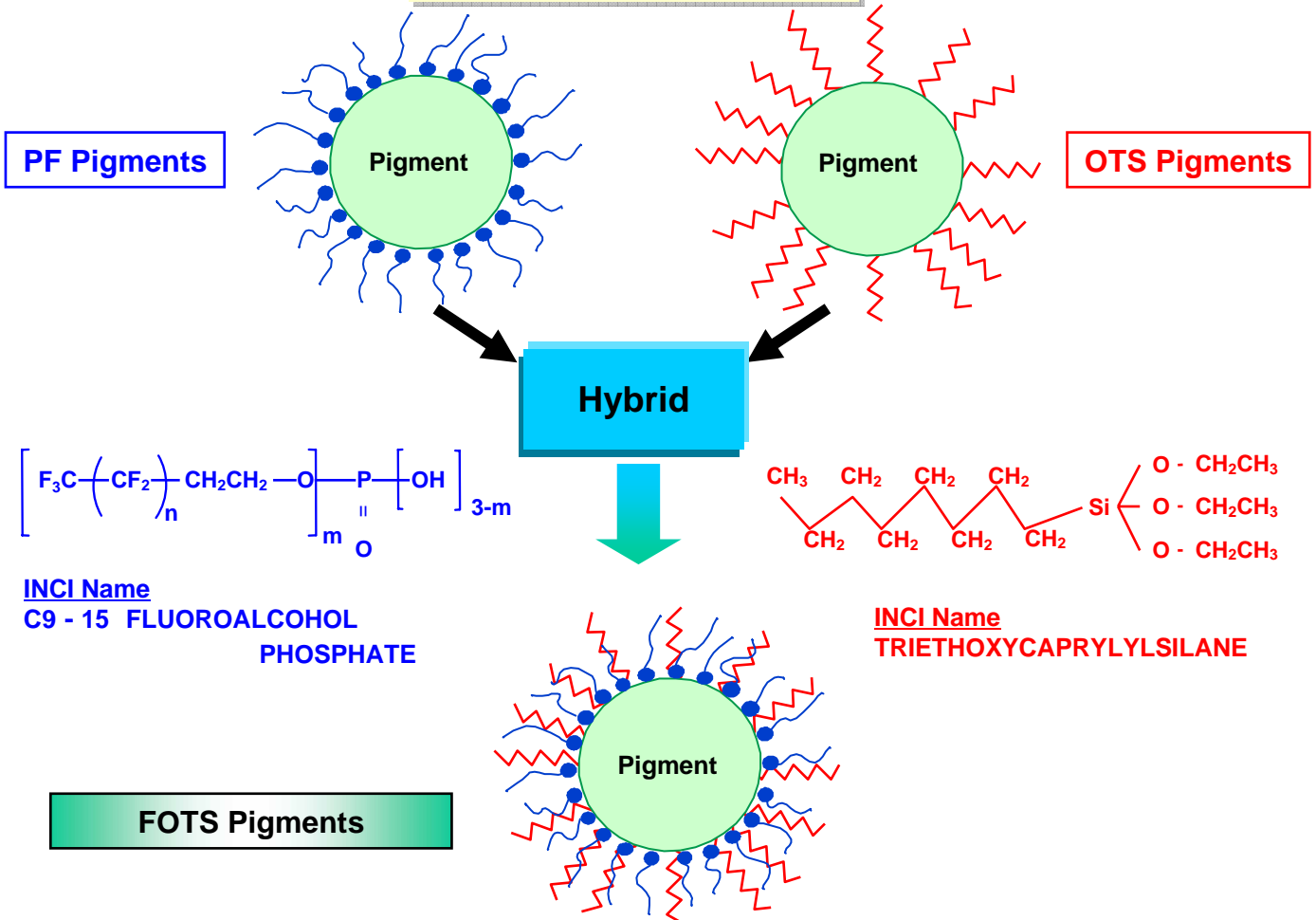
1. Good Water Repellency
2. Good Dispersability
(Low Viscosity Dispersion in Oil)
3. Creamy Feeling

Product Name	Contact Angle (degree)
ITT-2 TALC JA-46R	107
ITT-5 SERICITE TKC	118
ITT-7 MICA Y-3000	131
ITT-2 TiO ₂ CR-50	140
ITT-2 YELLOW LLXLO	140
ITT-5 RED R-516L	133
ITT-2 BLACK BL-100	144
ITT-5 ZnO-350	145
ITT-7 TTO-S-3	150

* Safety Test Results of ITT are available.

FOTS Treatment

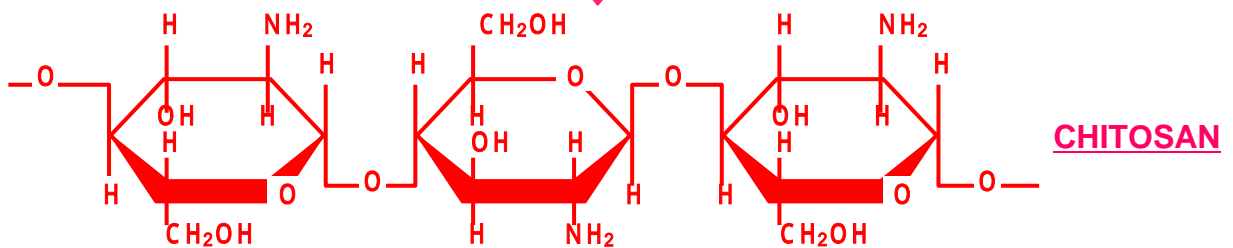
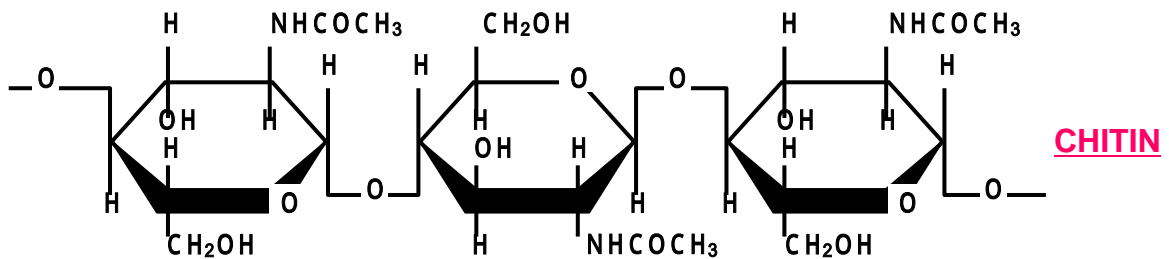
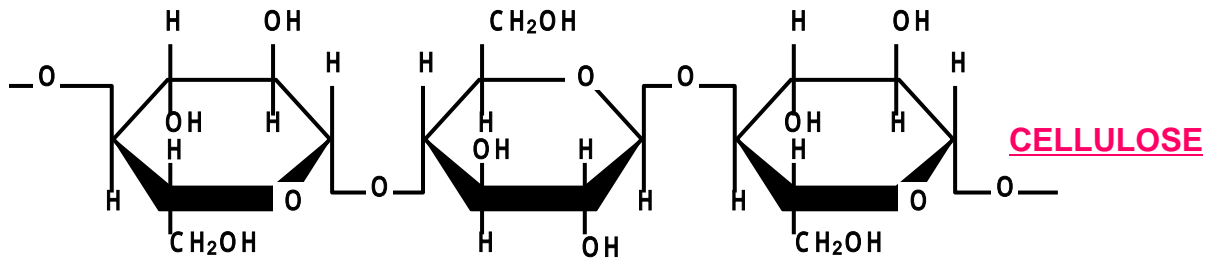
Image of FOTS Pigments
FOTS = PF + OTS



Other Hybrid Treatment

- NEW** FITT : PF&ITT
- FOTS : PF&OTS
- FSA : PF&ASC
- FS01 : PF&SI01

CT Treatment

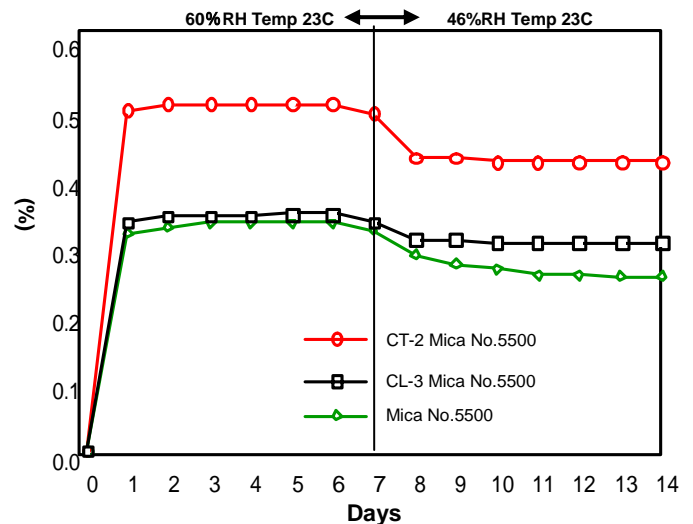


INCI Name: CHITOSAN

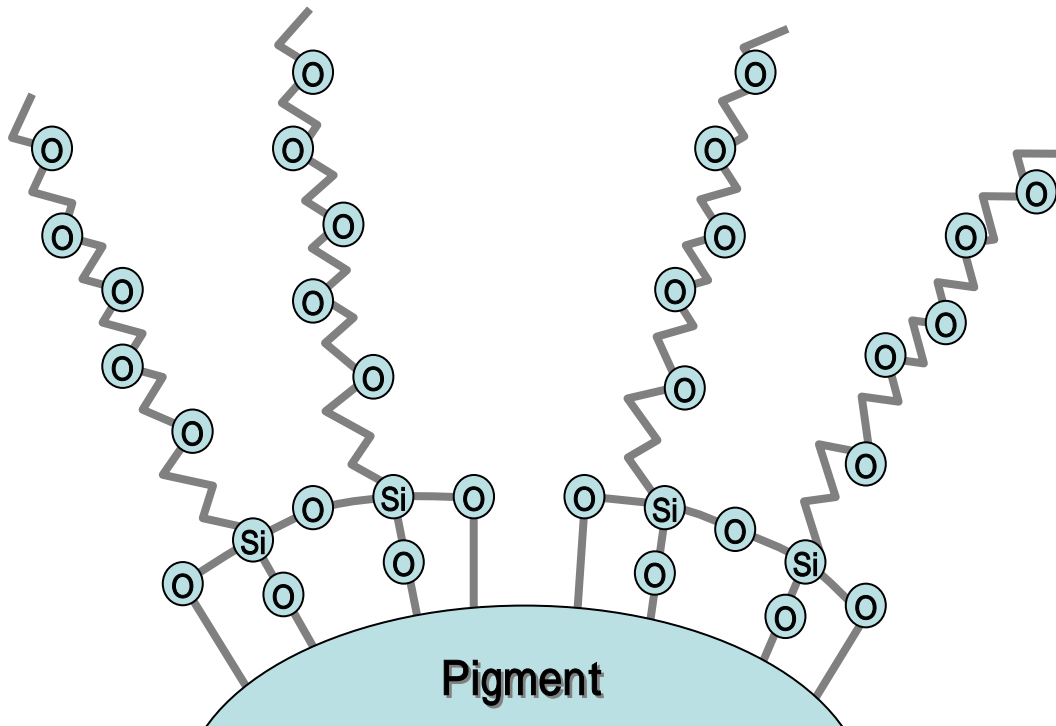
Advantage of CT Treatment

1. Moisturizing Effect
2. Safety
3. Irritancy can be inhibited by coating with chitosan polymer

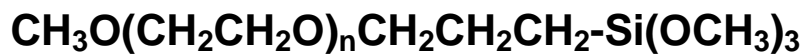
Moisturizing Effect of CT Treated Mica



PGS Treatment



PGS (PEG-Silane) Treatment Agent



INCI Name : METHOXY PEG-10 PROPYLTRIMETHOXYSILANE

Advantages

1. Hydrophilicity
2. Good Dispersability in Water
3. Less Sedimentation in Water

2 Weeks After Dispersion in Water

TiO₂



Non Treated

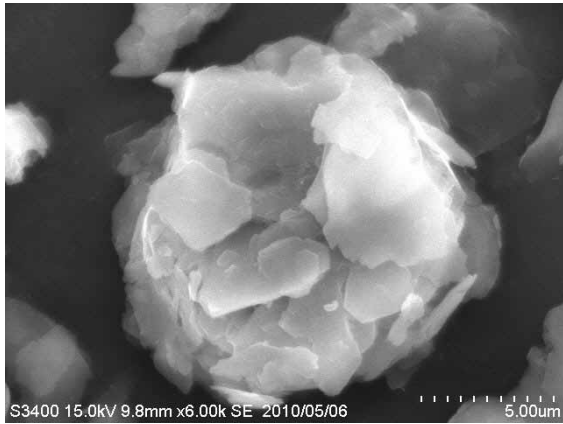
Micronized ZnO



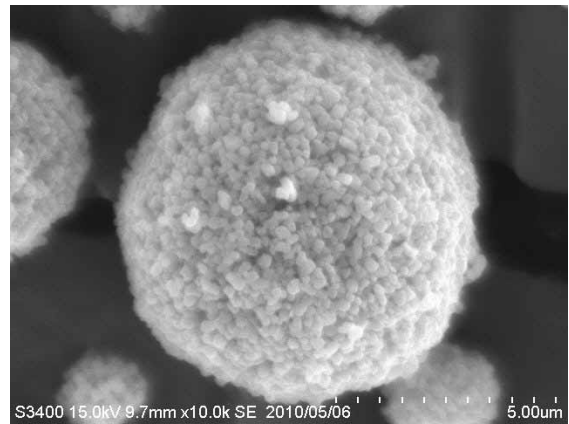
PGS Treated



C2 Treatment

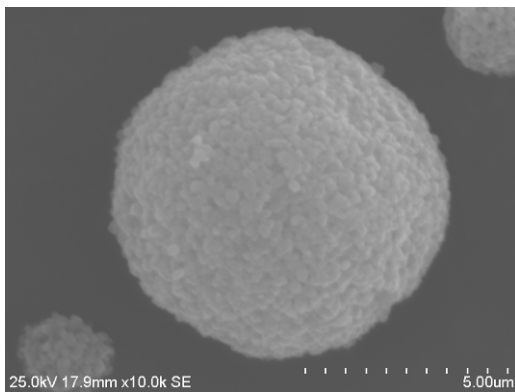


C2-5 SERICITE FSE



C2-5 TiO₂ CR-50

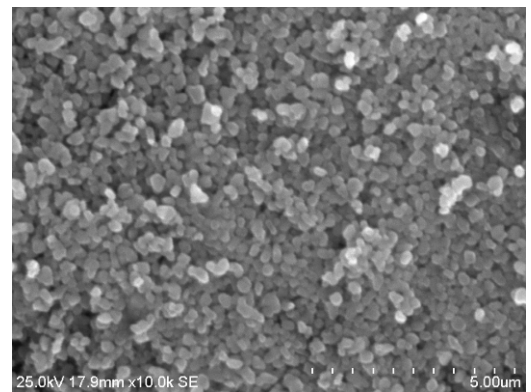
INCI Name: MICROCRYSTALLINE CELLULOSE



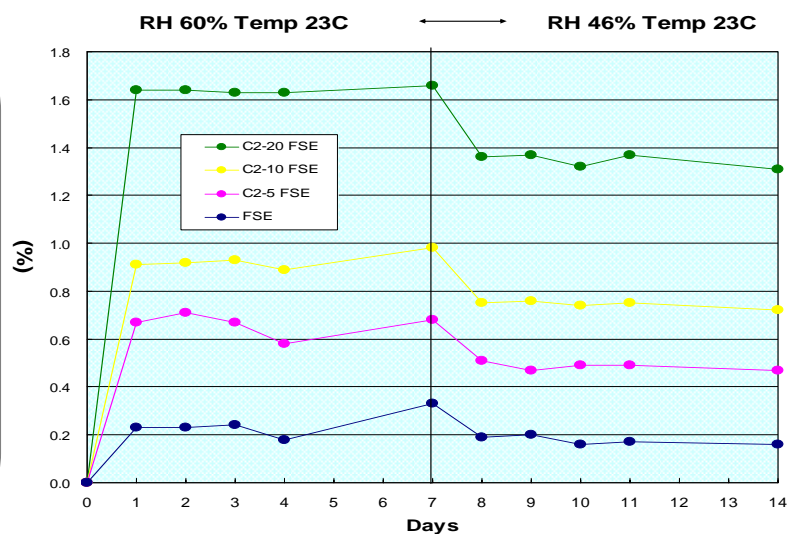
C2-5 TiO₂ CR-50



After Spread
by Finger



Water Absorption Rate



Advantage of C2 Treatment

1. Good Dispersability in Water
2. Superior Hydrophilicity
3. Good Compatibility with Skin
Good Adhesiveness
4. Safety
5. Can Control the Size of Soft Cohesion

FC2 Treatment

FC2

=

PF

+

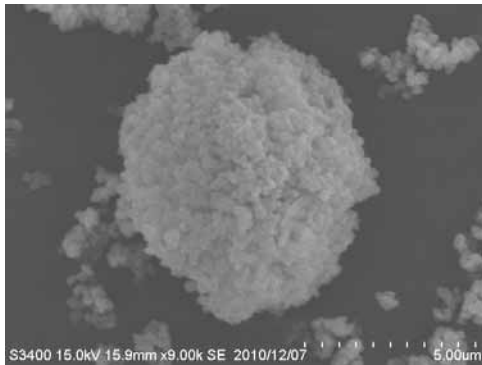
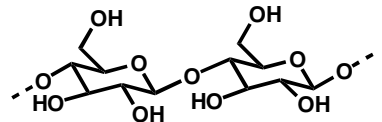
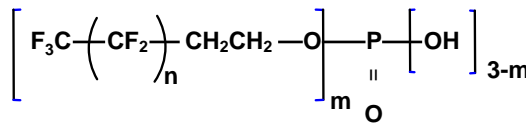
C2

INCI Name

C9 - 15 FLUOROALCOHOL
PHOSPHATE

INCI Name

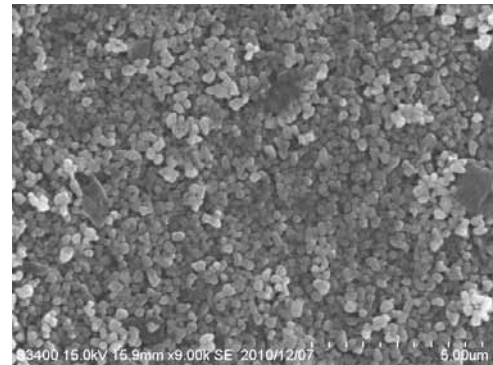
MICROCRYSTALLINE CELLULOSE



FC2-55 TiO₂ CR-50



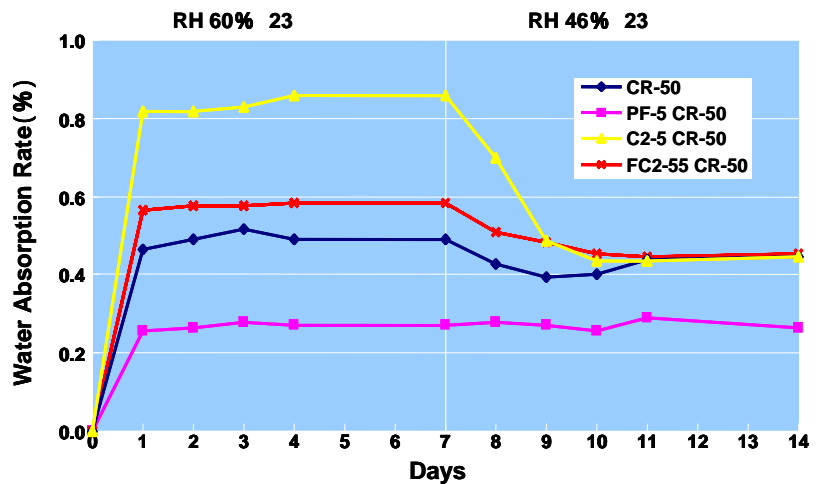
After Spread
by Finger



Water and Oil Repellency of FC2 Treated Pigments

Moisturizing Effect of FC2-55 TiO₂ CR-50

	Contact Angle (Degree)	
	Water	Oil
FC2-55 SERICITE FSE	85	111
FC2-55 MICA Y-2300	101	104
FC2-55 TALC JA-46R	87	98
FC2-55 TiO ₂ CR-50	141	122
FC2-55 YELLOW LLXLO	145	126
FC2-55 RED R-516L	150	125
FC2-55 BLACK BL-100	143	134



APD Treatment

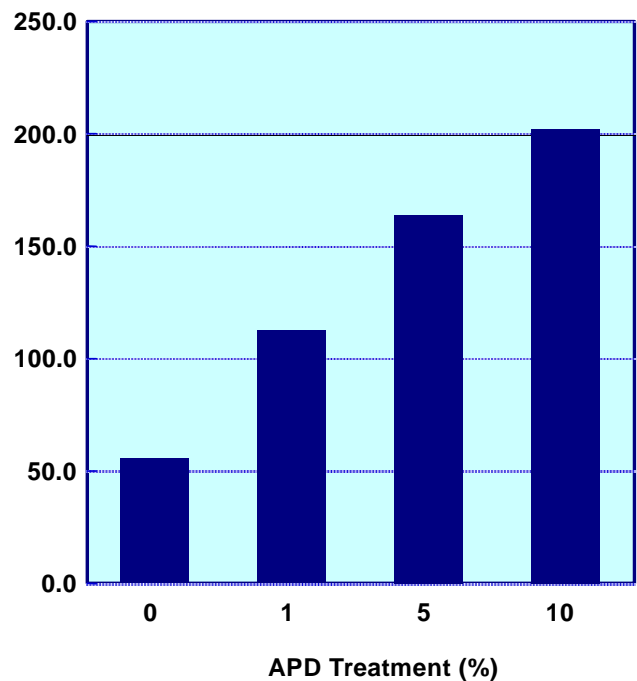


APD-5 SERICITE FSE

INCI Name: ACRYLATES COPOLYMER

Oil Absorption Rate of APD Treated Sericite

Oil Absorption Rate (ml/100g Powder)



Advantage of APD Treatment

1. Superior Oil Absorption
2. Can Combine More Binder in Formulation
More Possibility of Binder Base
3. Sebum From Skin Can be Absorbed