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# Improved Mineral Powders from Treatments and Sphericals

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# Outline

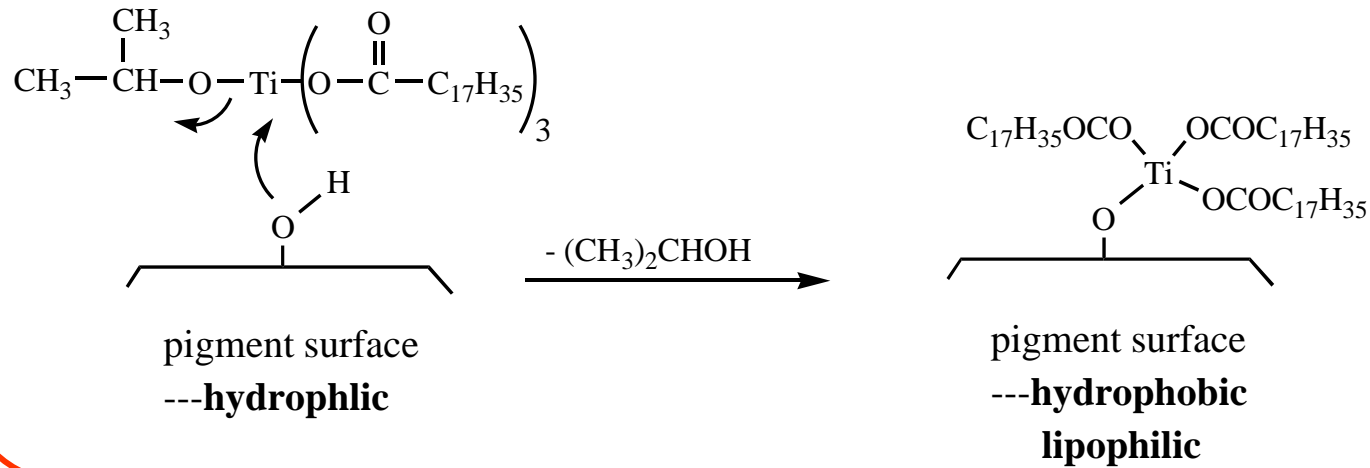
1. Common Treatments for Powders
2. Benefits from Treatments in Mineral Powders
3. Sphericals used in Mineral Powders
4. Benefits from using Sphericals
5. Benefits from using Treated Pearls in Powders

# Common Treatments for Powders

- Titanates
- Magnesium Myristate
- Silicones (Methicone/silanes/dimethicone/aminosilane)
- Hybrid treatment
- Lecithins

# Organo Titanate (ITT)

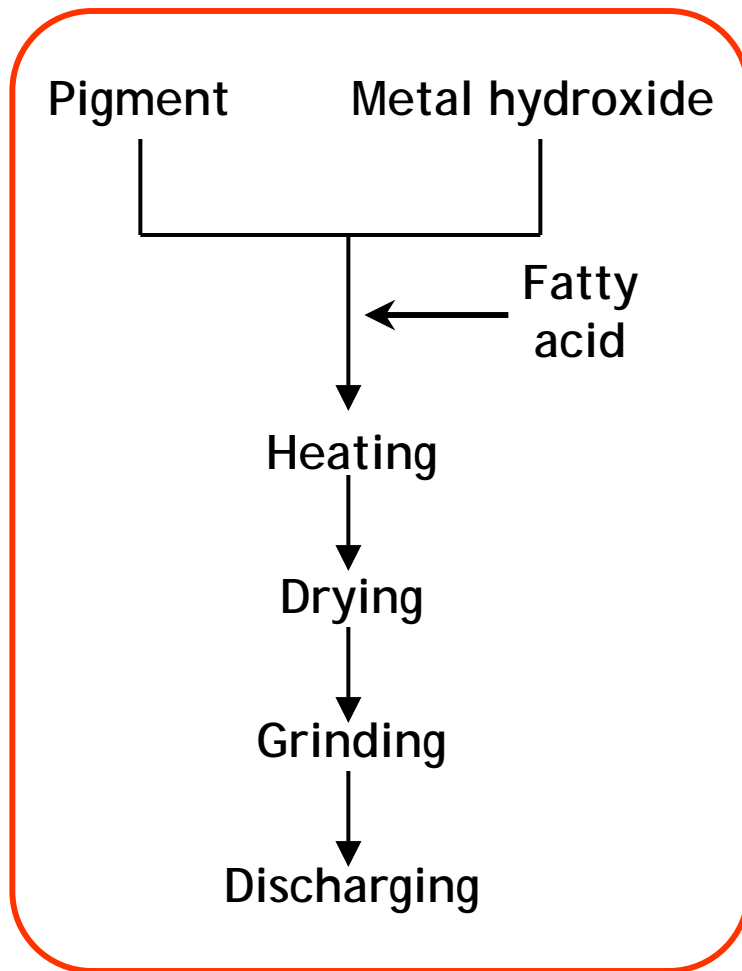
## Isopropyl Titanium Triisostearate



## Properties

- Aids in dispersing pigments into oils
- Lowers oil absorption
- Improves adherence to skin
- Gives improved feel

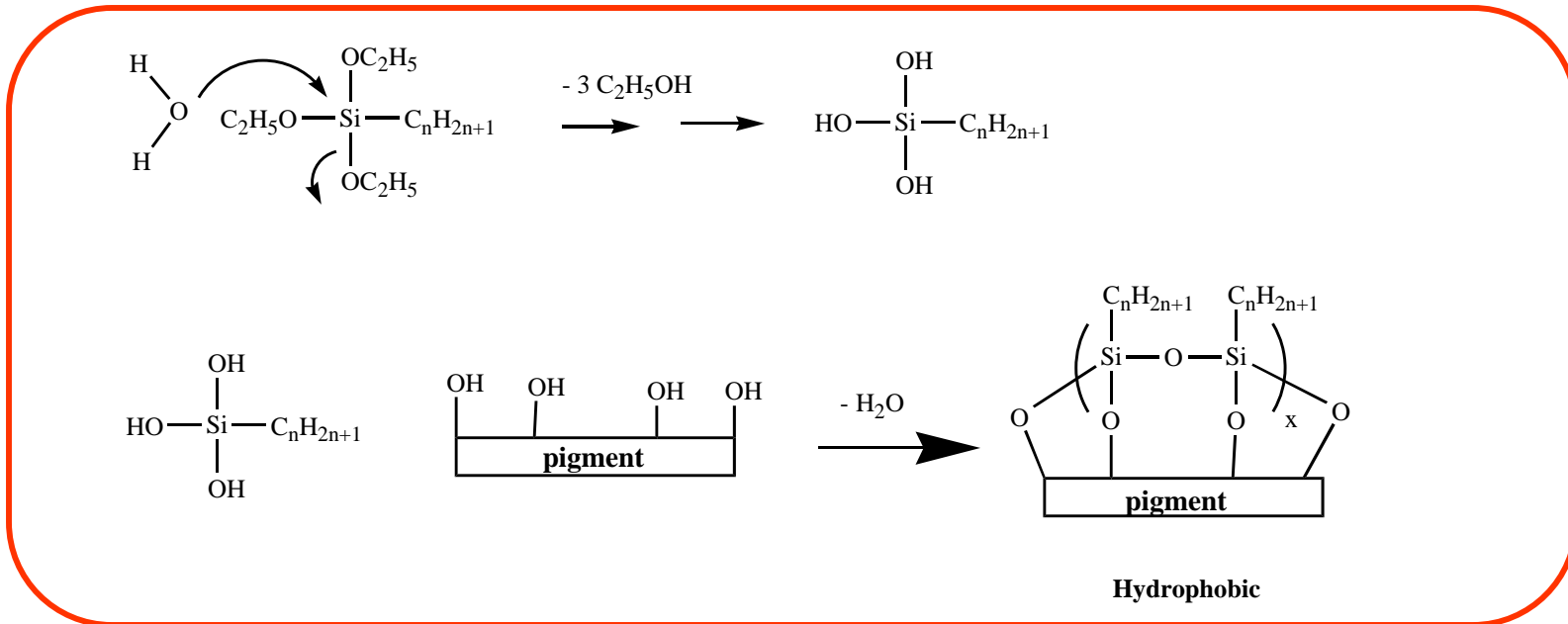
# Magnesium Myristate



## Properties

- Creamy feel
- Increased adhesion to skin
- Improved wear
- Better pressability
- Even finish
- Hydrophobic / Lipophilic

# Triethoxycaprylylsilane - one of silicones

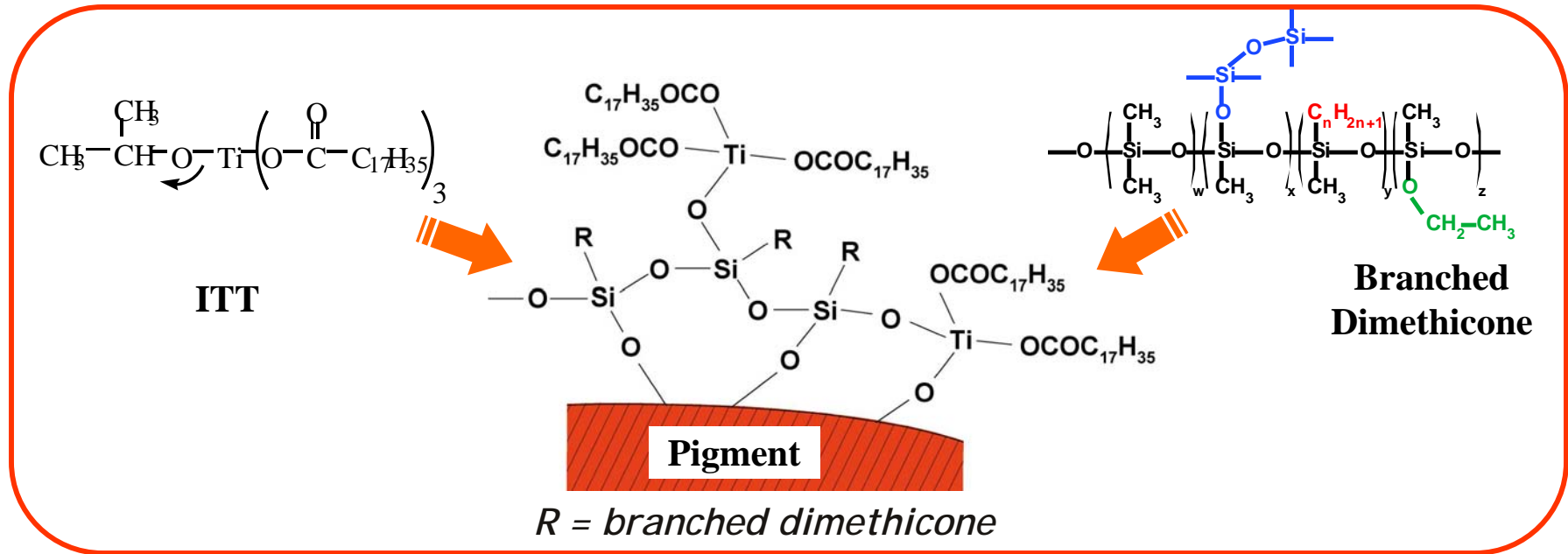


## Properties

Silicones (Methicone/silanes/dimethicone/aminosilane)

- Give excellent feel
- Great spreading on skin
- Lowers oil absorption

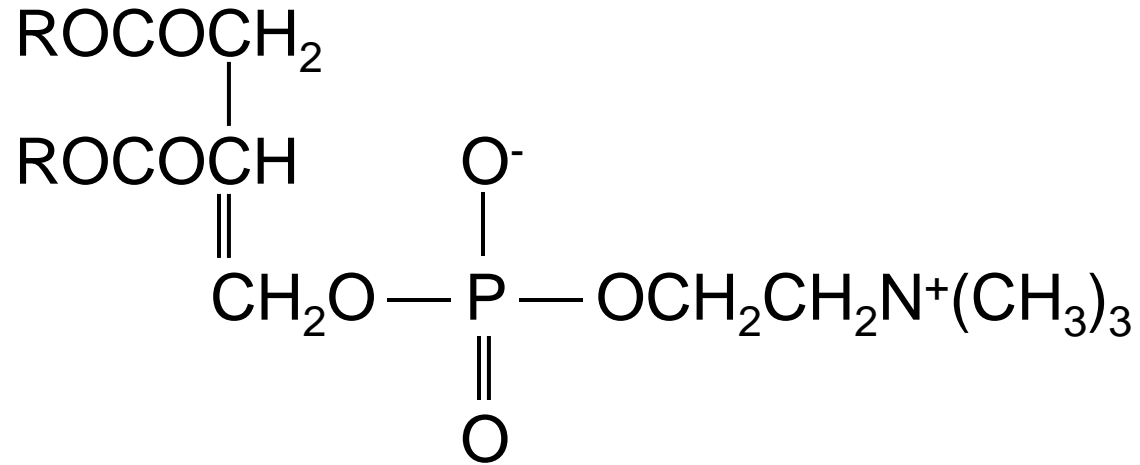
# Hybrid treatments (Titanates with Silanes, Perfluoro)



## Properties

- Yields benefits from both treatments
- Good adhesion, slip and spreading
- Reduce oil absorption
- Improves compatibility in hydrocarbons and silicones.

# Lecithin



## Properties

- Soft and creamy, high emolliency
- Good skin adhesion
- Natural

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# Benefits

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# What can Treatments do in Mineral Powders ?

- Increase adherence to skin
- Improve wear
- Add better slip and feel to powders
- Reduce oil absorption--especially pigments
- Help boost SPF by improving spreading and coverage

# Skin Compatibility

- Adherence : Long hydrocarbon chain has good skin affinity; particles of smaller size adhere better in general

*Examples of treated and untreated materials*

- Improved Spreading on Skin : silicones has low surface energy and low friction coefficient. Therefore, they are easy to spread, and lay down more evenly

*Examples of silane treated materials*

# Sun Protection - SPF

- Many Mineral Powders obtain SPF from 'minerals'.
- $\text{TiO}_2$  and  $\text{ZnO}$  are used for the SPF but ultrafine  $\text{TiO}_2$  and zinc oxide are extremely raspy and draggy.
- Treatments are used on these materials to improve slip and adherence to the skin.
- Treatments with organic material also further reduce the 'graying' associated with  $\text{TiO}_2$ .
- Higher SPF can be achieved when a film is laid down on the skin more evenly. Treatments help in this lay down.

# Feel

- Bare essentials ingredient label shows 16% TiO<sub>2</sub> and 18% ZnO.
- If you figure Bismuth Oxychloride at 30-35%, you have 70% of the formula. Only 30% is left for the mica and iron oxides. Bismuth is used to give some creaminess, sheen, adherence and coverage.
- Improved formulas can be achieved by using treatments on the materials.

*Examples*

# KPW-006 - Mineral Powder

Ingredients	KPW-006b Untreated	KPW-006a Treated
Sericite GMS-4C	75.70	-
GMS-11S2	-	75.70
MZ-500 (ZnO)	10.00	-
ZNO XZ-11S3 (treated ZnO)	-	10.00
Tipaque PF-671 (TiO <sub>2</sub> )	10.00	-
RBTD-11S2 (treated TiO <sub>2</sub> )	-	10.00
C33-210 Cosmetic Yellow	3.50	-
BYO-11S2	-	3.50
C33-215 Cosmetic Russet	0.60	-
BRO-11S2	-	0.60
C33-5201 Cosmetic Black	0.20	-
BBO-11S2	-	0.20

# Particle Size

- Additional improvement to the mineral powders can be achieved by jet milling treated powders.
- Smaller particle size can improve the feel of the treated material and improve deposition on skin and aid in increasing the SPF.

*Examples*

# UV Balance

- UV balance: PFA is at least 1/3 of SPF to provide broad-spectrum protection against entire UV exposure
- By using ultrafine TiO<sub>2</sub> of different particle size UV Balance can be achieved for global products.
- Below is an example of a UV Balance Pressed Powder

TiO<sub>2</sub> Blends

PPS (nm)	ratio
60	10
50	5
10	3

# KPP-014 - UV Balance Pressed Powder

Part	Percent	Ingredients	INCI name	Supplier
1	52.95	TALC N/MM3	Talc (And) Magnesium Myristate	Kobo Products
	16	Mica S/MM3	Mica (And) Magnesium Myristate	Kobo Products
	6	UV Balance Powder 100Y	Titanium Dioxide (And) Alumina (And) Dimethicone/ Methicone Copolymer (And) Iron Oxides (C.I. 77492)	Kobo Products
	6	UV Balance Powder 100R	Titanium Dioxide (And) Alumina; Dimethicone/Methicone Copolymer (And) Iron Oxides (C.I. 77491)	Kobo Products
	6	UV Balance Powder 100	Titanium Dioxide (And) Alumina (And) Dimethicone/ Methicone Copolymer	Kobo Products
	2.5	ZINC MYRISTATE	Zinc Myristate	Kobo Products
	1.75	BYO-12	Iron Oxides (C.I. 77492) (And) Isopropyl Titanium Triisostearate	Kobo Products
	0.4	BRO-12	Iron Oxides (C.I. 77491) (And) Isopropyl Titanium Triisostearate	Kobo Products
	0.2	BBO-12	Iron Oxides (C.I. 77499) (And) Isopropyl Titanium Triisostearate	Kobo Products
	0.1	PROPYL PARABEN NF	Propylparaben	International Sourcing
	0.1	METHYL PARABEN NF	Methylparaben	International Sourcing
2	2.8	LEXOL PG-865	Propylene Glycol Dicaprylate/Dicaprate	Inolex
	2.4	SF96-350	Dimethicone	Momentive/Kobo
	2.4	SF96-20	Dimethicone	Momentive/Kobo
	0.4	SS4267	Dimethicone (And) Trimethylsiloxysilicate	Momentive/Kobo

*The treated talc can easily be substituted with treated sericite for a pressed mineral powder.*

# KPP-014 - UV Balance Pressed Powder

## Description :

This formulation combines UV balance powders, to achieve a SPF 15 and a PFA 6.3. The treatments on the powders give good slip and application on the skin.

## Manufacturing Procedure :

1. Micropulverize Part 1 until color is fully developed.
2. Spray Part 2 to Part 1.
3. Blend well and micropulverize.
4. Press @ 300 psi.

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# Sphericals in Mineral Powders

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# Sphericals in Mineral Powders

Note that ingredient labels of these formulas contain sphericals :

- Neutrogena -- Polymethyl methacrylate (PMMA)
- Physicians Formula -- Silica
- Provocateur -- Polyethylene HDI/Trimethylol Hexylacetone Crosspolymer (Polyurethane)
- Jane -- Silica

# Benefits of Sphericals

- Give slip to the formula (Ball-bearing effect)
- Better spreading by increased slip
- Give soft focus effect and a more natural appearance

# Physical Properties

- Sphericals can range from soft to hard; from dry feeling to wetter/creamier feeling; vary in size and composition
- Common sphericals in Mineral Powders :
  - > PMMA
  - > Silica
  - > Polyurethane
  - > Nylon
  - > Polyethylene

# New Spherical

- Unique spherical with minerals incorporated can be used to give improved slip and adhesion. Adds to the Mineral Powder concept.
- PMMA composite with Calcium Phosphate
  - > Improved slip
  - > Great soft focus effect
  - > Good adhesion

# KPW-005 - Sheer Mineral Powder With SPF

Ingredients	KPW-005b Untreated	KPW-005a Treated	KPW-005c Treated
GMS-I2 (Sericite)	81.90	61.90	76.90
TTO-S-3 (TiO <sub>2</sub> )	15.00	-	-
JTTO-MS7 (treated TiO <sub>2</sub> )	-	15.00	15.00
TechPolymer PAC-M810	-	20.00	5.00
C33-210 Cosmetic Yellow	2.50	-	-
BYO-I2	-	2.50	2.50
C33-215 Cosmetic Russet	0.45	-	-
BRO-I2	-	0.45	0.45
C33-5201 Cosmetic Black	0.15	-	-
BBO-I2	-	0.15	0.15

## Manufacturing Procedure :

1. Blend Part 1 @ high speed for 3 minutes.

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# Advantages of Treated Pearls in Powders

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# Advantages of Treated Pearls in Powders

- Improves pressing
- Allows higher level of pearl to press
- Allows larger particle size to be pressed
- Better binder dispersion
- Gives better feel
- Better deposit on skin
- Better adhesion & wear

# Powder formula #1

Semi-frosted, 15% KTZ Pearls

Ingredients	Treated	Non-treated
Talc N/MM3	61.75	-
Talc Micro ACE P-2	-	61.75
Zinc Stearate	5	5
SP500	5	5
Binder #5	8	8
E7015 Red-11S2	4	4
E7053 Black	1.25	1.25
KTZ Bronze -11S2	15	-
KTZ Bronze	-	15

Binder #5

*Propylene Glycol Dicapryl/Dicapylate* 33.3

*SS4267* 10.0

*SF96-350* 23.3

*SF96-20* 33.3

# Powder formula #2

Frosted, 45% KTZ Pearls

Ingredients	Treated	Non-treated	Untreated pearl & treated talc
Talc N/MM3	14.38	-	14.38
Talc Micro ACE P-2	-	14.38	-
Zinc Myristate	20	20	20
Sunjin PMMA-S	5	5	5
Binder #5	12	12	12
E7015 Red-11S2	3.1	3.1	3.1
E7053 Black	0.52	0.52	0.52
KTZ Bronze-11S2	45	-	-
KTZ Bronze	-	45	45

Binder #5

*Propylene Glycol Dicapryl/Dicaprylate*

33.3

*SS4267*

10.0

*SF96-350*

23.3

*SF96-20*

33.3

# Powder formula #3

Frosted, 45% KTZ Pearls

Ingredients	Treated	Untreated
Talc N/MM3	19.38	-
Talc Micro ACE P-2	-	19.38
Zinc Stearate	18	18
SP500	5	5
Binder 4	9	9
E7015 Red-11S2	3.1	3.1
E7053 Black	0.52	0.52
KTZ Copper-I2	45	-
KTZ Copper	-	45

Binder #4

*Lexol PG-865*

92.5

*Koboguard 5400 CCT*

7.5

# Advantages of Treated Pearls in Powders

Formula #3



*Untreated ITT treatment*

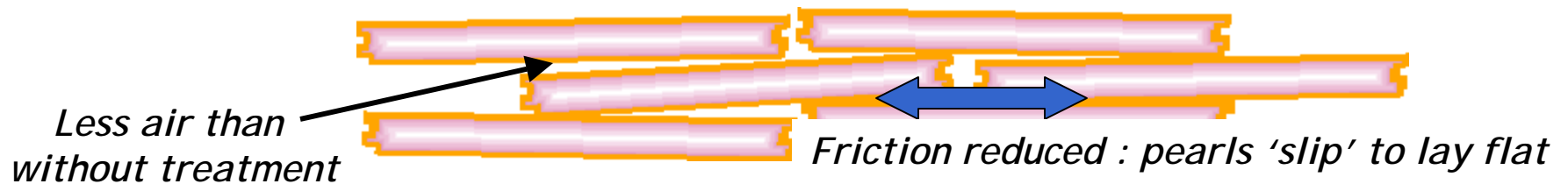
Formula #2



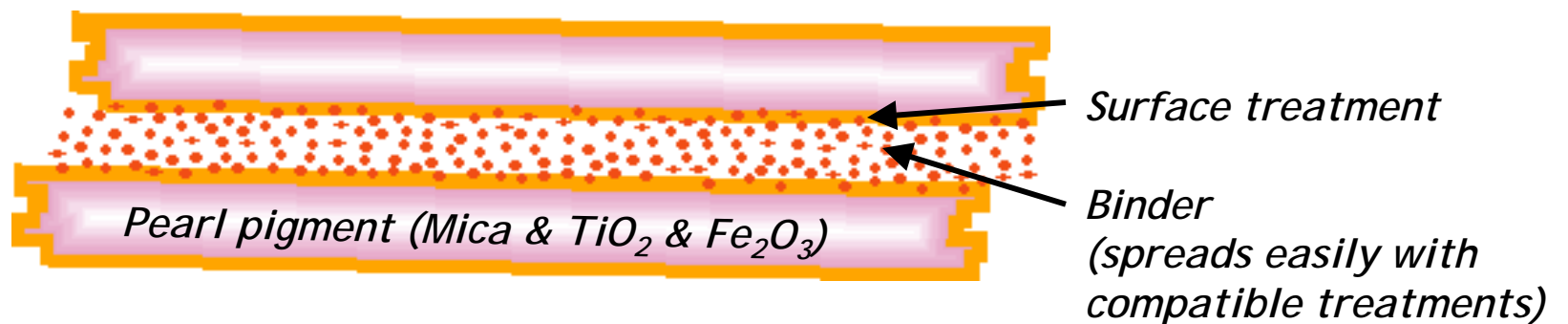
*Untreated Silane treatment  
treated talc  
untreated pearls*

# Improved Pressing with Treatments

- Less entrapped air : bulk density is higher
- Friction dramatically reduced / amount of treatment



- Surface treatment acts like 'glue' with compatible binder



# Conclusion

- Adhesion and wear of Mineral Powders can be improved through use of treatments on powders
- Slip and even laydown can be improved by using microspheres in mineral powders.
- New microsphere with mineral can dramatically increase slip in mineral powders and add to the mineral story claim.
- Treatment on pearls can increase the use level of pearls in pressed powders