

Surface Treatment to Improve the Wear of Eye Makeup

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ABSTRACT

Hydrophobic treatments impart water resistance but may cause pigments to become overly sensitive to wetting by sebum. The effect of varying the surface treatments on the processing characteristics and wear of eye shadow and mascaras was studied.

SURFACE TREATMENTS STUDIED

- Untreated pigment
- Triethoxycaprylyl silane
- Hydroxysilsesquioxane/Methylsilsesquioxane Copolymer
(Gelest SD Treatment proposed INCI name)
- Perfluorooctylethyl Triethoxysilane

MATERIALS AND METHODS

- Formulations prepared:
Eyeshadows: all pigments and fillers treated
Waterproof anhydrous mascara

- Tests performed:
Contact Angle
Wear

FORMULATIONS

Eye Shadow

Talc	54.30
Sericite	30.00
Zinc Stearate	3.00
Iron Oxides	7.20
Polydiethylsiloxane	1.50
	100.00

Mascara

Isododecane	31.05
Polyethylene	11.00
Candellila	4.50
Polyglyceryl-3 Diisostearate	0.25
Pentaerythrityl Rosinate	2.00
Sodium Benzoate	0.20
Zinc Stearate	1.00
Silica Silylate	1.00
Bentone® Gel SS-71	35.00
Black Iron Oxide	12.00
	100.00

RESULTS

	Contact Angle (water) (°)	
	Powder E/S	Mascara
Untreated	70	95
Triethoxycaprylylsilane	120	110
Perfluorooctylethyl Triethoxysilane	130	-
Hydroxysilsesquioxane/Methylsilsesquioxane Copolymer	120	110

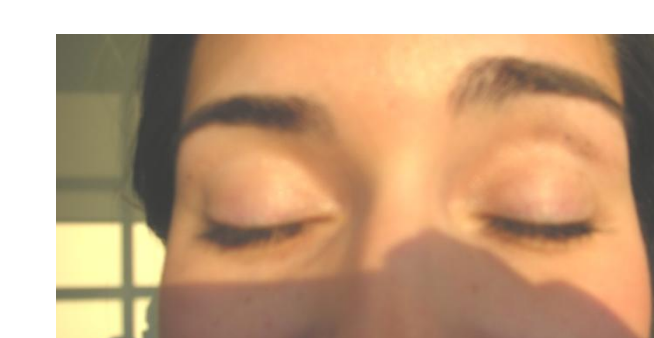
	Contact Angle (mineral oil) (°)	
	Powder E/S	Mascara
Untreated	20	40
Triethoxycaprylylsilane	20	30
Perfluorooctylethyl Triethoxysilane	60	-
Hydroxysilsesquioxane/Methylsilsesquioxane Copolymer	45	50

	Wear (5 subjects)			
	Powder E/S		Mascara	
	4 hours	6 hours	6 hours	8 hours
1. Untreated	ok	creasing	smudging	smudging
2. Triethoxycaprylylsilane	creases	creasing, color change	smudging	severe smudging
3. Perfluorooctylethyl Triethoxysilane	ok	wear, no creasing	*	
4. Hydroxysilsesquioxane/Methylsilsesquioxane Copolymer	ok	creasing	ok	smudging

*dry, grainy, due to poor dispersion



Eyeshadow: #4 vs #2



Mascara: #2 vs #4

DISCUSSION

Contact angle:

- All treatments prevent wetting by water (increase contact angle to >90°).
- **Perfluorosilane** treatment is the most hydrophobic and lipophobic

Wear:

- **Triethoxycaprylylsilane** treatment increases tendency to crease and be wet by sebum.
- **Perfluorosilane** treatment improves crease resistance in powder eye shadow but wets so poorly that the pigments cannot be incorporated into dispersed systems.
- **Hydroxysilsesquioxane//Methylsilsesquioxane Copolymer** treatment improves crease resistance and adhesion in powder eye shadow and imparts smudge resistance in anhydrous mascara

SUMMARY

Gelest SD surface treatment offers the combination of improved adhesion and resistance to wetting by oil and water needed to improve wear in eye area cosmetics.