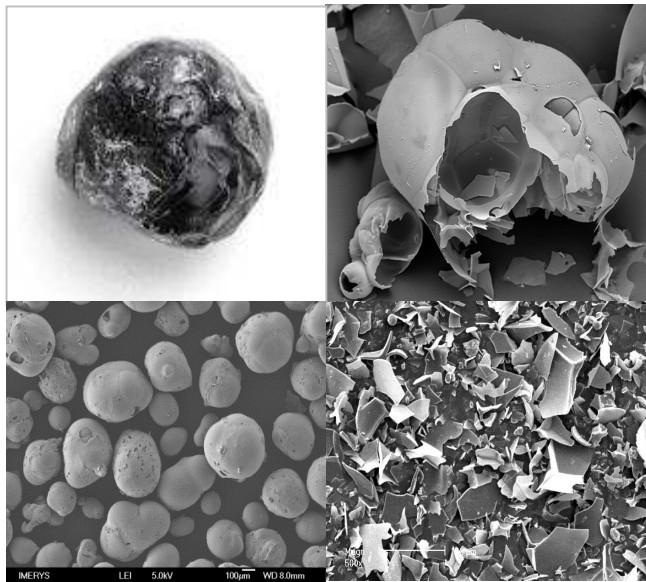


Perlite for Cosmetics



IMERCARE™
P A R I S



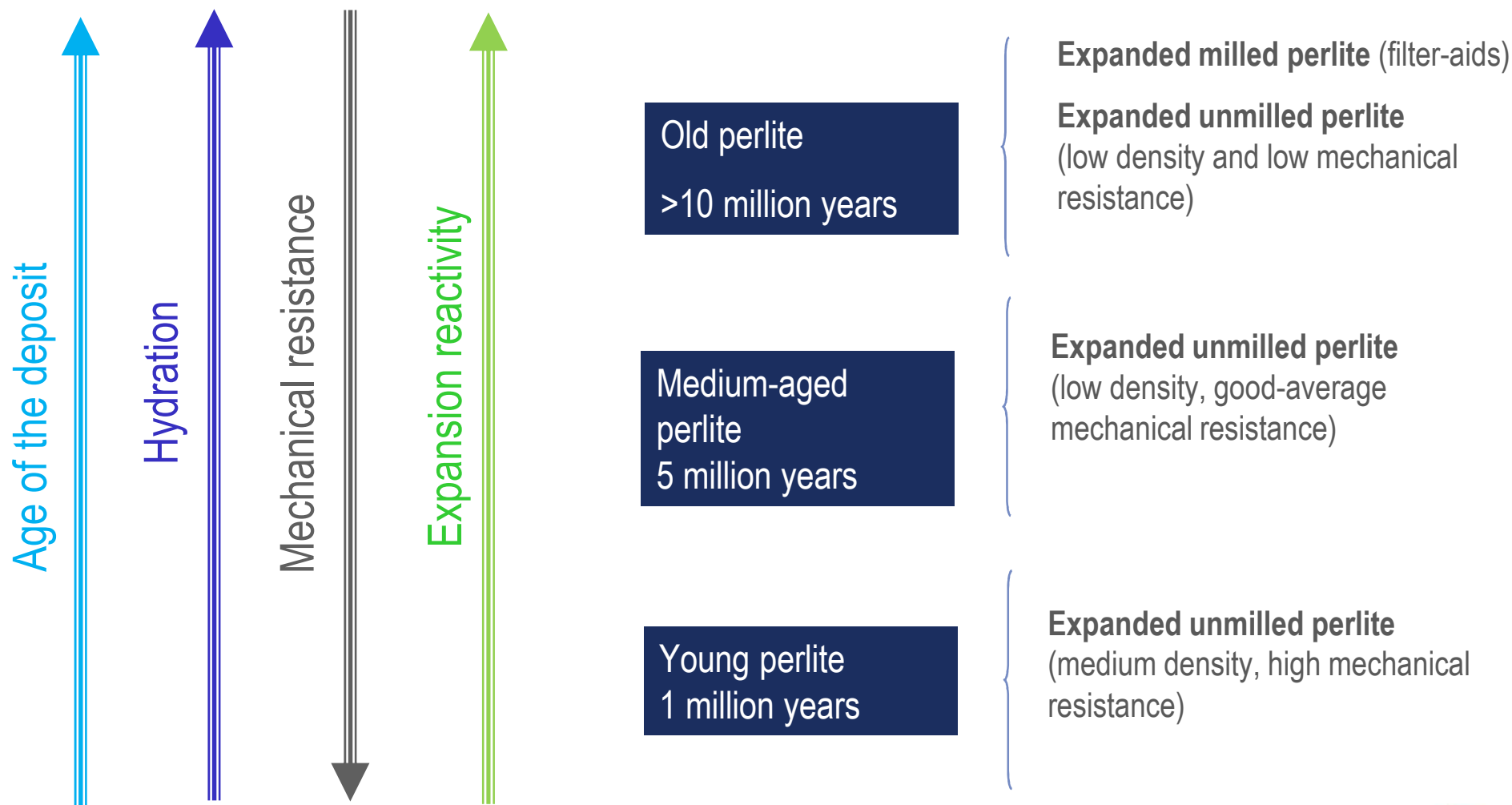
Origin of perlite

- ◆ Perlite is a hydrated, naturally occurring glass.
- ◆ Hydration occurs from the absorption of near-surface water into the glass:
 - perlite contains 2-6% combined water
 - takes a minimum of 1 million years to form
- ◆ Glasses are rare:
 - occur in volcanic rock with high SiO_2 content (explosive volcanos)
 - de-vitrification renders perlite unusable after 15-20 millions years



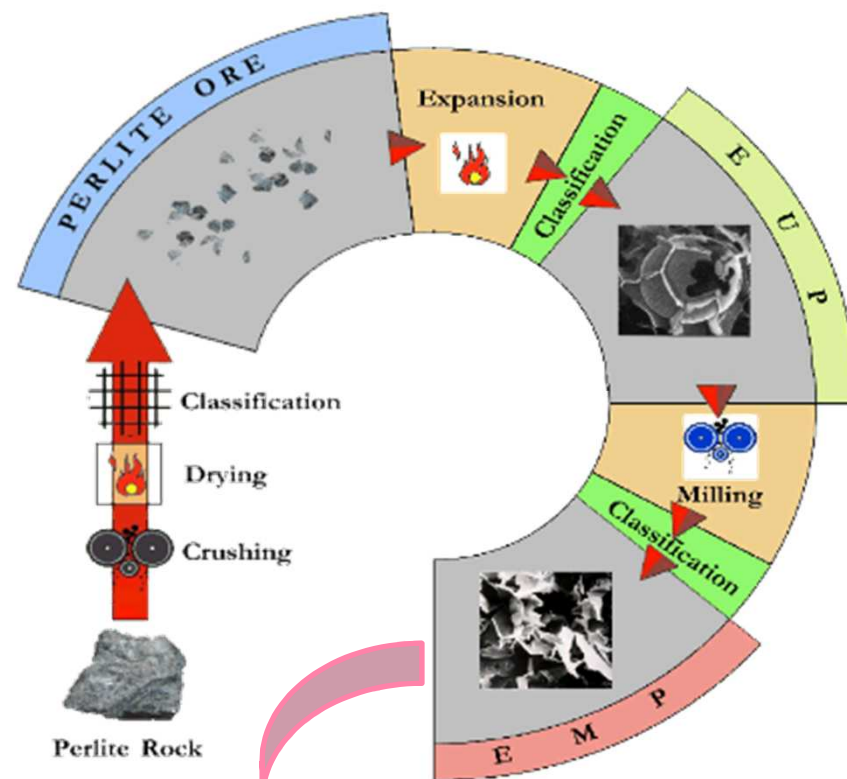
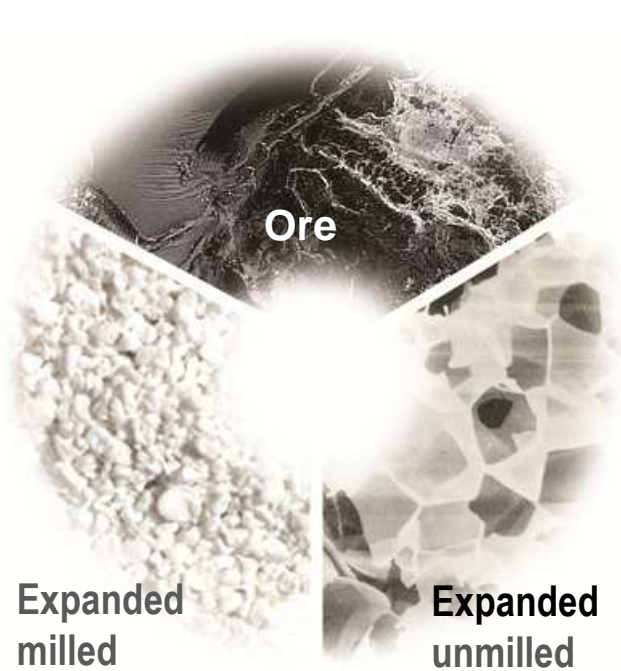
Ore qualities

Typical applications



Perlite process

IMERCARE[™]
PARIS



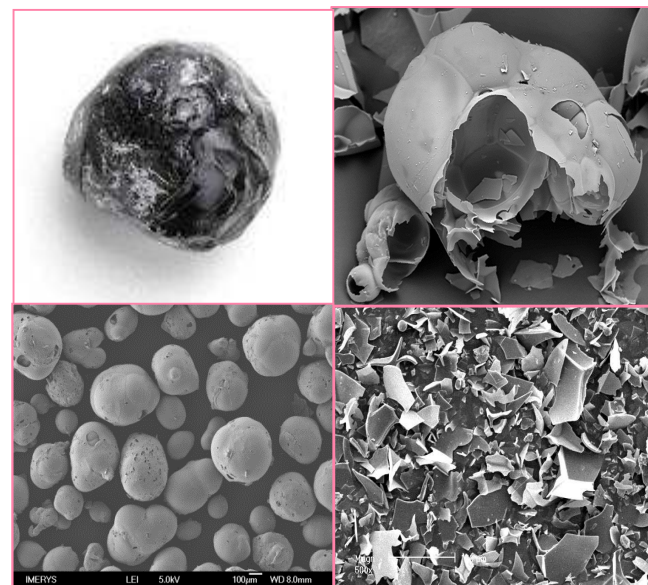
Patented process to
obtain ImerCare[™]

ImerCare™ perlite properties

IMERCARE
PARIS

■ Main properties

- ◆ Ultra high absorbency power (oil and water)
- ◆ Pure white colour (no grey, high luminosity)
- ◆ No volume changes after liquid absorption
- ◆ Maintains dry touch after liquid absorption (non tacky effect)
- ◆ No pellets after drying
- ◆ Non greasy effect, soft touch
- ◆ Medium refractive index (no traces, invisible on skin)
- ◆ Good skin tolerance
- ◆ Good fragrance carrier
- ◆ Matting and gloss control
- ◆ Gentle abrasion
- ◆ Chemical resistance, inertness
- ◆ Neutral pH (6.5 to 7.5)



Main applications

- ◆ Hair care
- ◆ Tooth care
- ◆ Make-up
- ◆ Body and face scrubs
- ◆ Toiletries

Perlite: absorption power

Water and oil absorption of different minerals		
	Oil absorption (ml/100g)	Water absorption (ml/100g)
ImerCare [™] 400D	220	230
Perlite	45-270	40-250
Kaolin	40-50	40-60
Talc	30-50	30-50

Perlite: absorption power

Powders in market

- Silicas
Aerosil 200 Evonik Degussa
- Modified starches: absorption 200%
Waterlock superabsorbent C200 grain processing
Octacare X100 Avecia
- Crosslinked acrylic polymer:
Permasorb 30
Luquasorb 1303 BASF
- Micronized waxes (polyethylene)
- Bismuth oxychloride

Recommended grades:

- ◆ ImerCare[™] 20P
- ◆ ImerCare[™] 25P
- ◆ ImerCare[™] 30P

Technical advantages of perlite versus current powders

▪ Combines 2 absorbing properties:

Oil absorption

- Non greasy effect
- Good fragrance capacity tenacity

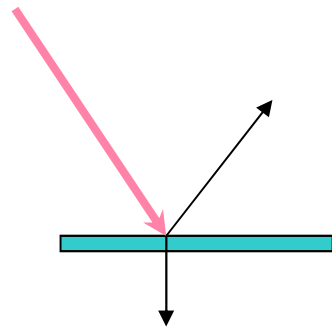
High water absorption

- 40% to 300%
- Maintains dry touch after liquid absorption (non tacky effect)

- No volume changes after liquid absorption
- Medium refractive index, transparency on skin (no traces)
- Pure white color (no grey)
- Good skin tolerance
- Low apparent density
- No pellets after drying
- Mineral origin



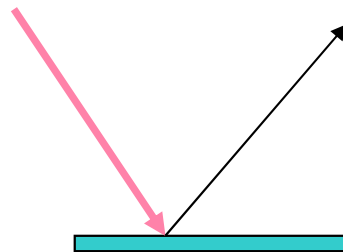
Perlite: matting power



Specular reflexion
+
Partial transmission

GLOSS & SILK EFFECT

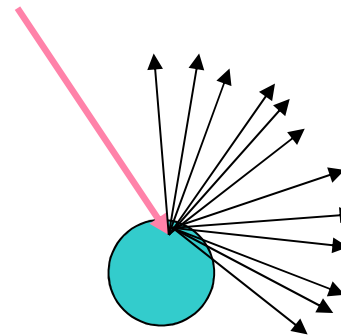
Mica
Oxychlorure of bismuth



Specular reflexion

ULTRA SHINY EFFECT

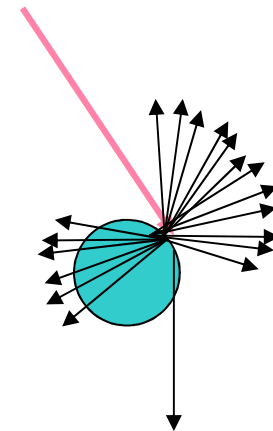
Borosilicates
Metallic pigments
Paillettes



Light diffusion

MATTING EFFECT

Perlite
Diatomite
Kaolin, Talc...



Light diffusion
+
Partial light transmission

SOFT FOCUS EFFECT

PMMA
Nylon

Silica
Composites

Matting power: creams for oily skin with long lasting matt effect

IMERCARE[™]
PARIS

	Product name	INCI name	%W/W	Supplier
A	Emulgade SE PF	Glyceryl Stearate, Cetareth-20, Cetareth-12, Cetaryl alcohol, Cetyl palmitate	5	BASF
	Lanette O	Ceraryl alcohol	1	BASF
	Labrafac CC	Caprylic/Capric Triglycerides	5	Gattefosse
	Vegelight	Coconut alkanes (and) Coco-caprylates/Caprates	5	Grant
	Apricot Oil	Prunus armeniaca kernel oil	1	Bertin
	Bioxan SF T50	Tocopherol (mixed)	0.1	Masso
B	Water	Aqua	76,8	Copper Univar
	Glycerin	Glycerin	3	
	Satixane CX911	Xanthan Gum	0.4	
C	ImerCare 2K or 25P	Kaolin or perlite	2	IMERYS
D	Perfume	Parfum	0,6	
E	Preservatives	Preservatives	TBD	
F	Dermofeel PA3		0.1	
G	Bioxan Acetate 1300IU	Tocopherol Acetate	0.1	Masso
H	pH adjustor		TBD	
		Total	100	

Imercare[™] 25P

Imercare[™] 2K



% gloss at 75 deg
ImerCare[™] 25P = 2.3

% gloss at 75 deg
ImerCare[™] 2K = 14.5

■ Both perlite and kaolin provide matt effect but:

- ◆ Combination of high oil absorption and particle size of perlite provides:
 - deeper matt effect
 - longer lasting matt effect
- ◆ The right perlite grade provides the best balance between matting effect, long lasting and skin feel

Perlite: matting power

Powders in market

- Nylon powders
Orgasol - Arkema
- Modified starches
- PMMA
Covabead - Waker
- Porous silicas ▲

Recommended grades

- ◆ ImerCare™ 20P
- ◆ ImerCare™ 25P
- ◆ ImerCare™ 30P

Technical advantages of perlite versus current powders:

- **Oil absorption:**
 - Non greasy effect, non tacky
 - Sebum absorption, sebum control
 - Long lasting matt effect
- **Medium refractive index:** invisible on skin
- **Pure white color:** luminosity
- Good skin tolerance
- Low specific and apparent density
- **Mineral origin**

Perlite: gentle abrasion power in toothpaste

■ Project scope

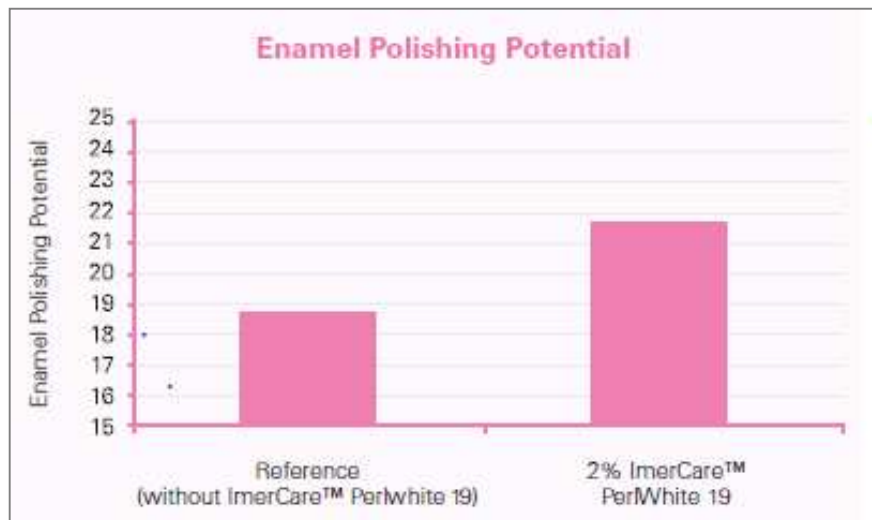
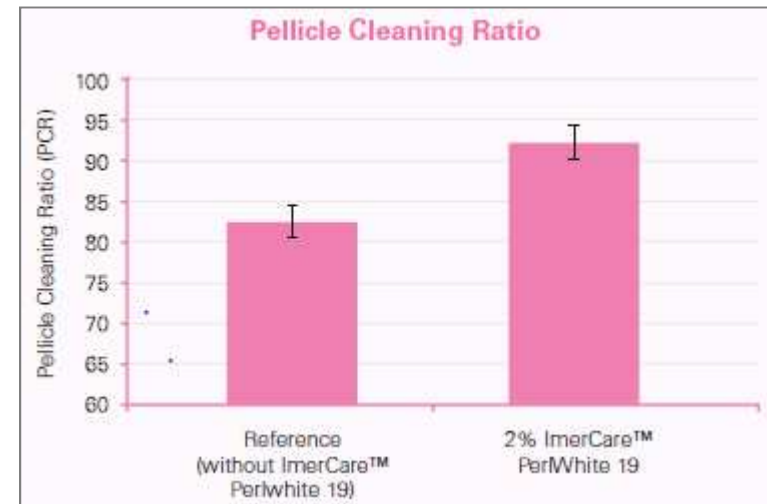
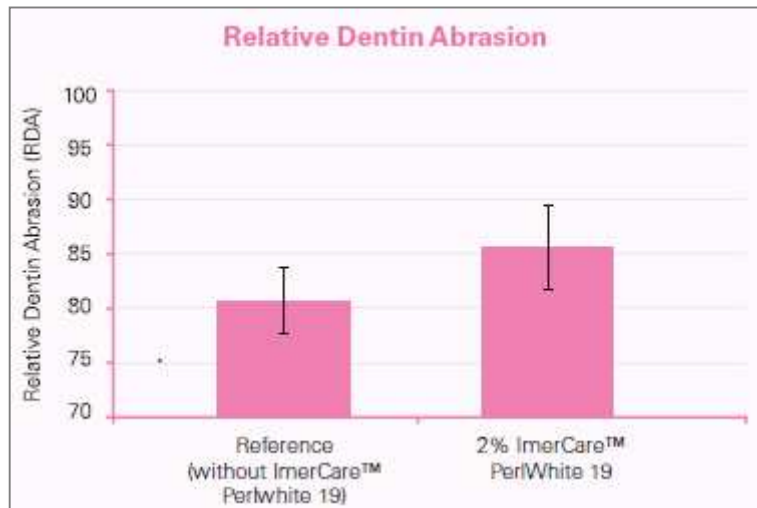
- ◆ Use of perlite as whitening booster additive
- ◆ Dedicated grade development for toothpaste
- ◆ Formulation based calcium carbonate
- ◆ Clinical testing and evaluation conducted by the *Oral Health Research Institute at Indiana University, USA*

Phase	Ingredient	INCI name	Function	Supplier	%
A	Carbopol 974 NF polymer	Carbomer	Binder	Lubrizol	0.70
	Deionised water	Aqua	Diluent	-	20.00
B	Xanthan gum oral care grade	Xanthan gum	Binder	Jungbunzlauer	0.69
	Glycerin USP	Glycerin	Humectant	-	4.82
	C* Sorbidex NC 16200	Sorbitol (70% solution)	Humectant/Sweetener	Cargill	43.00
C	Surfac SMFP pharma	Sodium monofluorophosphate	Anti-caries agent	Surfachem	0.75
	Sodium saccharin	Sodium saccharin	Sweetener	-	0.20
	Deionised water	Aqua	Diluent	-	15.00
D	ImerCare™ PerlWhite 19	Perlite	Abrasive	Imerys	2.00
	Calcium carbonate	Calcium carbonate	Abrasive	Imerys	12.50
E	Surfac SLS/BP powder	Sodium lauryl sulfate	Surfactant/foaming agent	Surfachem	0.34
	Color'N Cap Sil Blue 5601	CI 42090 and silica	Cosmetic colourant	-	q.s
	Flavour	-	Flavour	-	q.s



Perlite: gentle abrasion power in toothpaste

IMERCARE[™]
PARIS



IMERCARE[™]
PARIS

PerlWhite 19

A new, perlite-based,
gentle abrasive
for toothpaste

- Gentle abrasive effect
- Improved polishing
- pH neutral



Perlite: gentle abrasion power in shampoo

IMERCARE[™]
PARIS

Gentle exfoliation power of selected perlite boosts dandruff removal



1. Development of shampoo formulas including:

Formulation
Stability tests
Sampling
Challenge tests



2. Clinical tests including:

Safety tests:
In vitro ocular and skin irritation



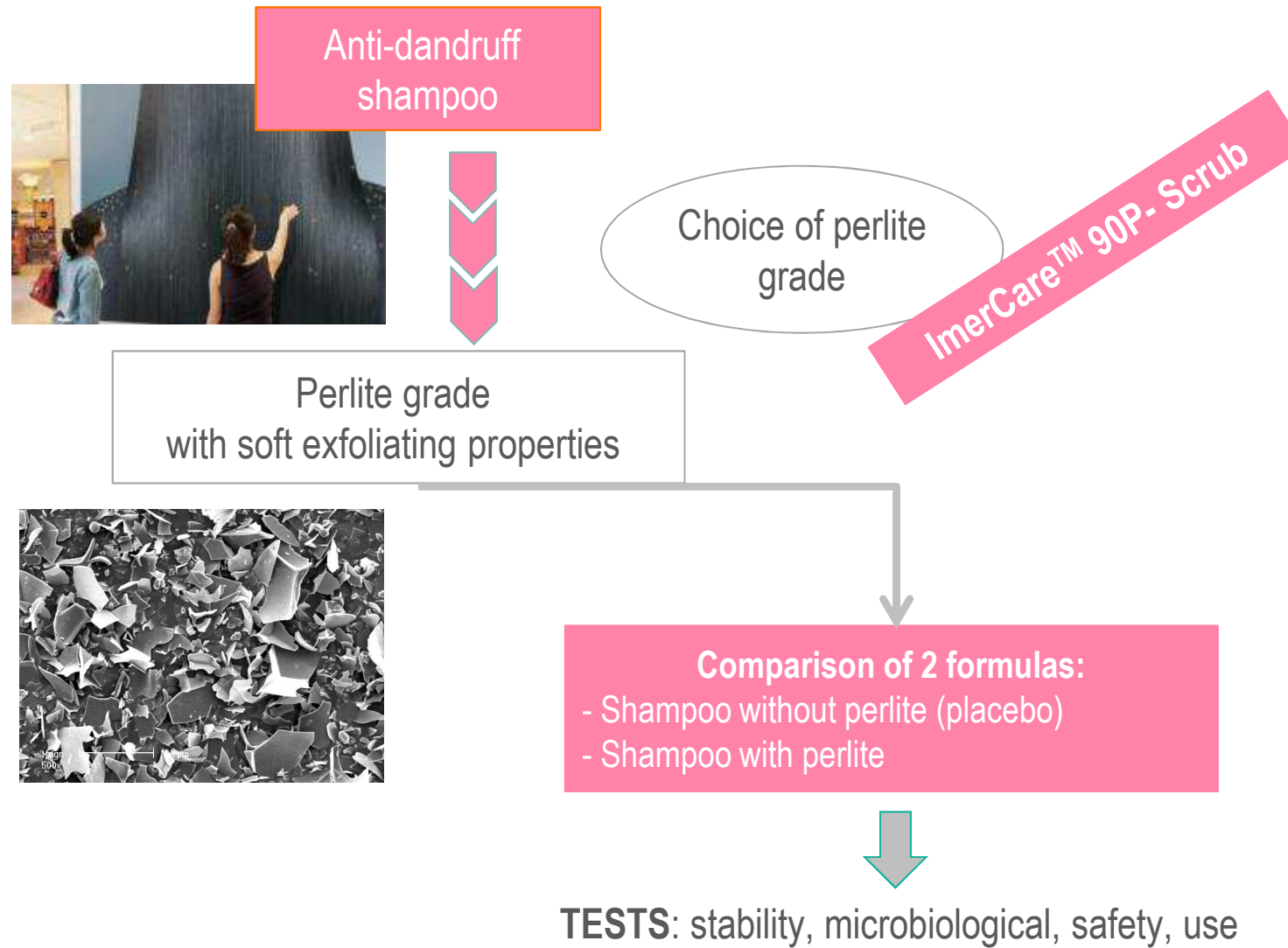
3. In-vivo evaluation of shampoos including:

Sensorial tests by 22 adults for 2 weeks



4. Interpretation of results and general report

Perlite: gentle abrasion power in shampoo



Perlite: gentle abrasion power in shampoo

ImerCareTM 90P-Scrub

- **Functionality: soft exfoliation**
- **Formulation type: classic-based**
- **Comparison of 2 formulas:**
 - Placebo (shampoo without perlite)
 - Shampoo with ImerCareTM 90P-Scrub
- **Laboratory process:**
 - Blend B in A at room temperature
 - Mix until xanthan gum is dispersed
 - Blend all ingredients of phase C one by one
 - Homogenize D then blend A+B+C into mixture
- **Mix in other ingredients one by one.**

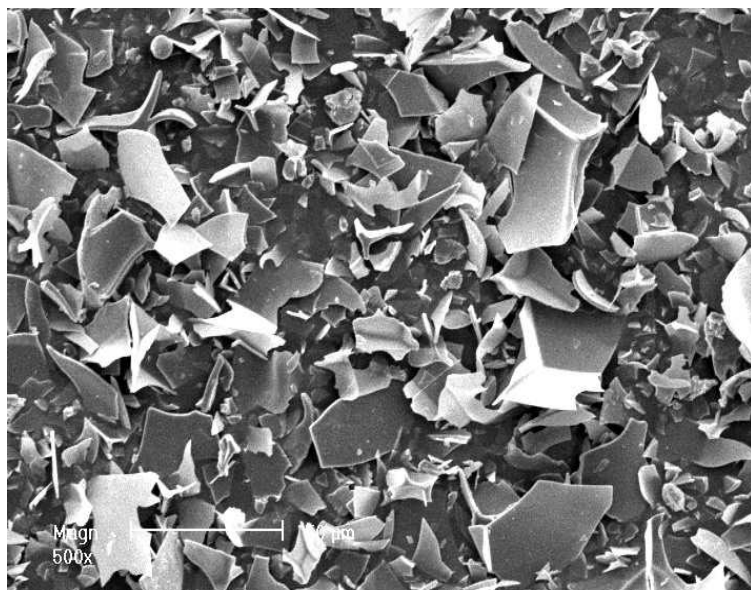
COMMERCIAL NAME	CHEMICAL NAME	SUPPLIER	%
WATER			1.7
TEXAPON NSO IS	AQUEOUS PREPARATION OF ALKYLETHER SULFATE C12-C14	BASF	24.00
PLANTACARE 2000IP	AQUEOUS PREPARATION OF ALKYL POLYGLUCOSIDE	BASF	10.00
WATER			37.40
CARBOPOL AQUA SF-1	CARBOMER	LUBRIZOL	6.00
NaOH			1.90
LAMESOFT PO 65	AQUEOUS PREPARATION OF ALKYL POLYGLUCOSIDE, PARTIAL ESTERS OF FATTY ACIDS WITH GLYCEROL, CARBOXYLIC ACID	BASF	0.60
GEOGARD 221	DEHYDRACETIC ACID, BENZYL ALCOHOL, AQUA	LONZA	0.90
DERMOFEEL PA3	SODIUM PHYTATE	LUCAS MEYER	0.10
DERMOFEEL G10 LW	POLYGLYCERYL 10 LAURATE, AQUA	DR STRAETMANS	1.20
FRAGRANCE			0.60
DEHYTON AB 30	BETAINE	BASF	7.00
SYMBIO QUAT	AQUEOUS PREPARATION OF HYDROXYPROPYL OXIDIZED STARCH PG TRIMONIUM CHLORIDE, STARCH HYDROXYPROPYLTRIMONIUM CHLORIDE	DR STRAETMANS	1.50
COMPERLAN 100	COCAMIDE MEA	BASF	0.50
SODIUM CHLORIDE			0.50
CITRIC ACID (20% IN WATER)			1.00
IMERCARE 90P-SCRUB	Perlite	IMERY'S	5.00
TITANIUM DIOXIDE	Titanium dioxide	KRONOS	0.10
TOTAL			100.00

Perlite: gentle abrasion power in shampoo

Panel

23 adults with dandruff who use anti-dandruff shampoo:

- 12 women
- 11 men
- 30-50 years old



ImerCare™ 90P-Scrub

Test protocol

1st shampoo		2nd shampoo	
7 days = 3 applications		7 days = 3 applications	
After 1st use	After 7 days' use	After 1st use	After 7 days' use
Online questionnaire 1	Online questionnaire 2	Online questionnaire 3	Online questionnaire 4
Reference n° S3 lot 050313 (Placebo)		Reference n° S4 lot 050313	

- Shampoos were applied to short or mid-length hair under normal use conditions.
- Testers had to rub their scalp then wait 1 to 2 minutes before rinsing.

Perlite: gentle abrasion power in shampoo

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After first application*

- Better scalp purification
- Significant effect on amount of foam
- More rapid foam formation
- 1 comment saying rinse-off less easy

After one week of use*

- Hair is cleaner
- More efficient on persistent dandruff
- Better scalp purification
- Better scalp comfort
- Less effect on dandruff which returns in time

*All tests conducted by IDEA clinic company

Perlite: gentle abrasion power in shampoo

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ImerCare™ 90P-Scrub: 100% natural perlite

- Boosts anti-dandruff removal through soft exfoliation power (patent pending)
- Boosts foam production in terms of quantity of foam and foaming speed (patent pending)
- Boosts scalp comfort after several applications including scalp purification
- Does not prevent dandruff from coming back as no chemical action
- EcoCert Certified
- pH neutral and chemically inert



Use selected perlite to offer similar exfoliation performance as PE beads in Scrub applications



1. Development of shower gel formulas:

- Formulation
- Stability tests
- Sampling
- Challenge tests



2. Clinical tests including:

- Safety tests:
- In vitro ocular and skin irritation



3. Shower gel in-vivo evaluation including:

- Sensorial evaluation by 20 adults for 4 weeks



4. Interpretation of results and general report



Perlite: scrub power

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PARIS

Shower gel



Choice of the grade from among
30 different products based on perlite or
other minerals and technologies

ImerCare™ 400P- Scrub

Perlite grade
with **exfoliating properties**



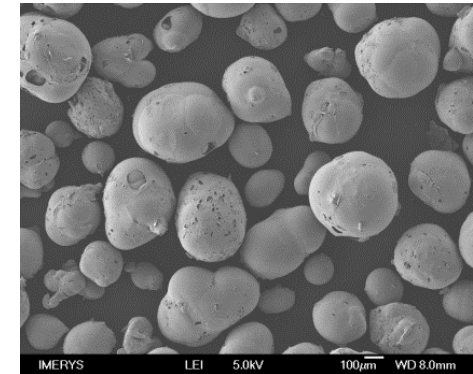
Comparison of 2 formulas:

- Shower gel with PE Beads (placebo)
- Shower gel with perlite



TESTS:

- Stability, microbiological, safety, panel testing
- Exfoliation methodology has been developed by Imerys to characterise products under identical conditions



Perlite: scrub power

How to formulate ImerCare™ 400P-scrub

■ Reduce amount vs PE beads:

Due to density difference, % weight must be reduced by at least half to obtain same exfoliation performance

■ Minimal formula changes:

- A slight increase in thickener / rheology modifier may be needed to maintain the particles in suspension. ▲
- Use a suitable suspension agent in your formulation, such as acrylates copolymer, xanthan gum.

■ How to use in the process:

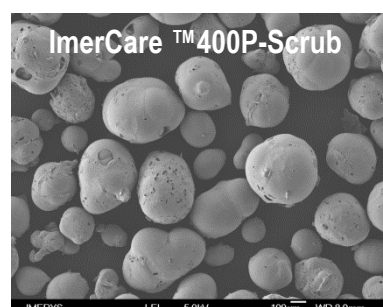
- ImerCare™ 400P-Scrub should be incorporated at the end of the mixing process, under low shear to avoid breaking the spherical structure.
- As perlite is a natural volcanic glass, it will not be affected by heat in a mixing process.

COMMERCIAL NAME	INCI Name	%
Water	Aqua (Water)	34.95
CARBOPOL AQUA SF-1	Acrylate Copolymer at 30% MA	8
PROTELAN AG 818	Sodium Cocoyl Glutamate at 30% MA	20
NaOH Solution at 10%	Sodium Hydroxide	3
PLANTACARE 2000 UP	Decyl Glucoside at 50% MA	10
DEHYTON AB30	Coco-Betaine at 30% de MA	9
LAMESOFT PO 65	Caprylyl/Capryl Glucoside	0,5
ORAMIX CG 110	Coco-Glucoside/Glyceryl Oleate	4
VERVEINE	Perfume	0.5
EUXYL PE9010	Phenoxyethanol/Ethylhexylglycerin (preservative)	1
Citric acid	Citric Acid	0.75
Water	Aqua (Water)	5
ImerCare 400P-Scrub	Perlite	3
BLUE 1	CI 42090 (Blue 1)	0.00013
Water	Aqua (Water)	0.12987
Yellow 5	CI 19140 (Yellow 5)	0.00017
Water	Aqua (Water)	0.16983
TOTAL		100

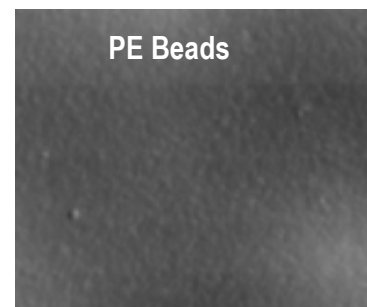
Study objectives	Compare the acceptability of 4 exfoliating shower gels under usual conditions
Method	Monocentric and comparative study: <ul style="list-style-type: none">• D1 to 7: daily use of 2 shower gels , one on each leg• D8: visit center to complete 2 questionnaires (one per gel)• D8 to 28: wash out period• D28 to 35: daily use of the 2 other shower gels, one on each leg• D35: visit center to complete 2 questionnaires (one per gel)• D36: visit center for comparative evaluation of the 4 products (questionnaire)
Population	<ul style="list-style-type: none">• 20 volunteers• Women• Aged 18 to 70• Dry skin on legs• No skin lesions, no allergies• No healing treatment• Users of exfoliating shower gels
Assessment criteria	Analysis of volunteers' sensations relating to questionnaire answers and comparison of results of 4 exfoliating shower gels

Perlite: scrub power

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SEM of PE beads and ImerCare™400P-Scrub



Scrubbed surface with PE beads and ImerCare™400P-Scrub according to Imerys exfoliation method

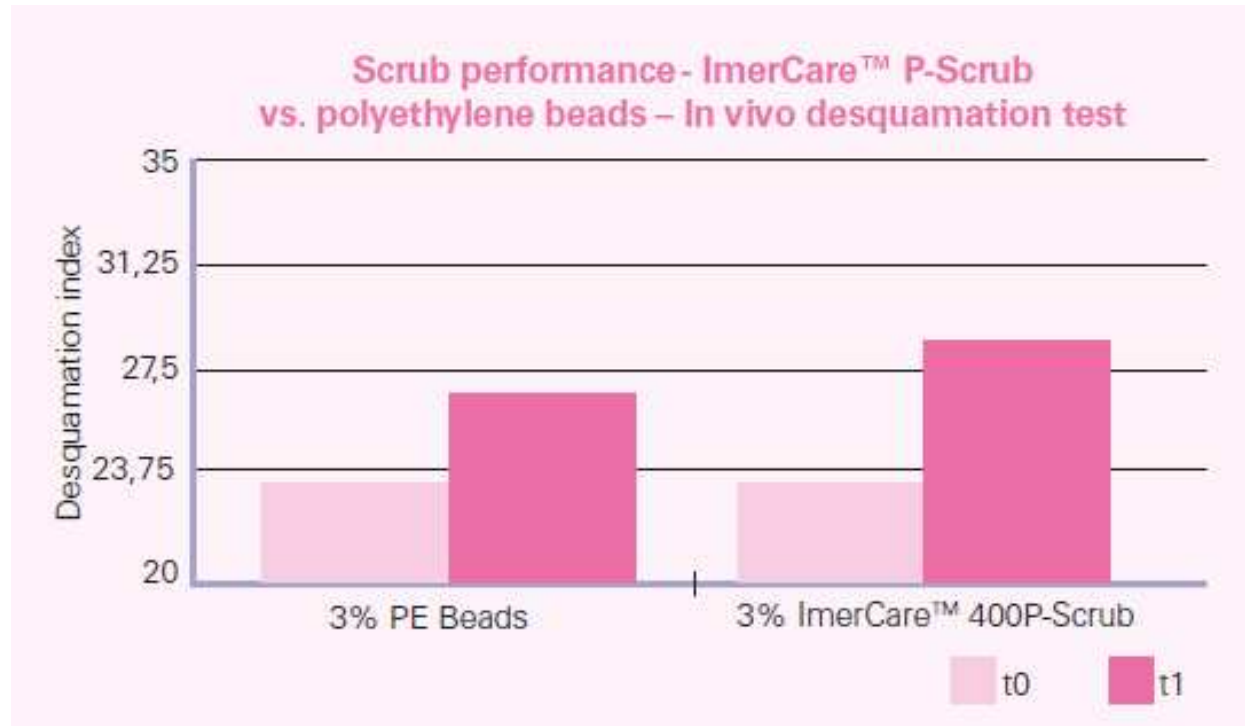
Results	PE Beads	ImerCare™400P-Scrub
% of women who would buy the different gels	76	81
Comments	<ul style="list-style-type: none"> - Good exfoliation with no skin irritation - Soft skin after application - Good texture, easy to apply and rinse 	<ul style="list-style-type: none"> - Excellent exfoliation with no skin irritation - Soft skin after application - Good texture, easy to apply and rinse - Quantity and texture of foam - 86% said performance was better than with PE beads.
Recommended use	3 to 5% weight	For equivalent particle size range, use at 50% vs PE beads due to density difference

ImerCare™400P-Scrub can be used as a direct drop for PE beads with better exfoliation performance or in a lower concentration for similar efficacy

All tests conducted by IDEA clinic company

Perlite: scrub power, desquamation results

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In tests, the shower gel containing ImerCare[™]400P-Scrub demonstrated better exfoliation efficiency than the one containing PE Beads formulated at constant weight 3%

All tests conducted by IDEA clinic company

IMERCARE[™]
PARIS

P-SCRUB

A new, perlite-based,
gentle abrasive for
scrub applications

■ Gentle exfoliation

■ Ecological alternative to PE beads

■ Enhanced scalp comfort

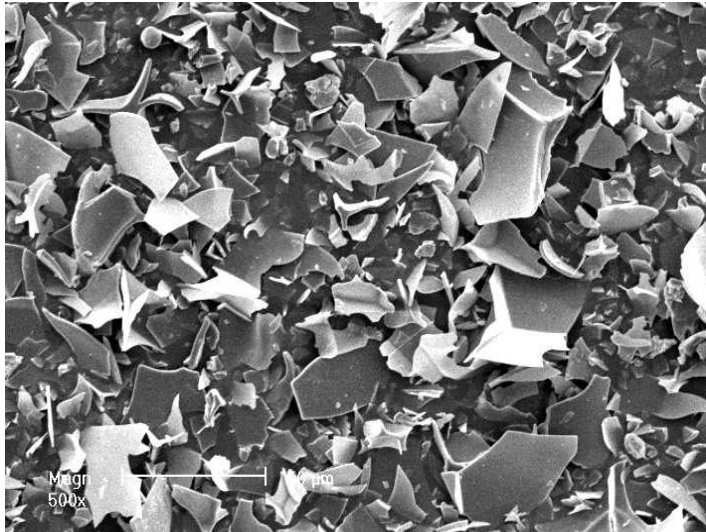
3 available grades:

- ImerCare[™] 190P-Scrub (50-250 microns)
- ImerCare[™] 270P-Scrub (100-300 microns)
- ImerCare[™] 400P-Scrub (100-500 microns)



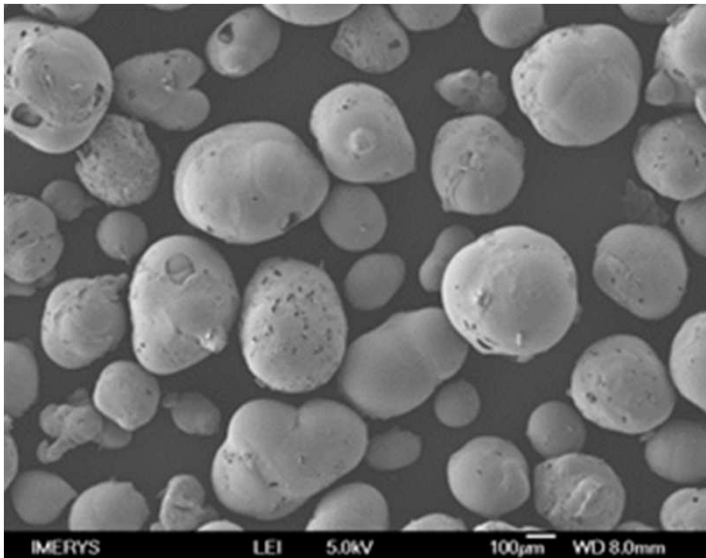
ImerCare™ perlite range

IMERCARE™
PARIS



■ Expanded milled perlite technology

- ImerCare™ 20P
- ImerCare™ 25P
- ImerCare™ 30P
- ImerCare™ 90P-Scrub
- ImerCare™ 120P-Scrub
- ImerCare™ PerlWhite 19



■ Expanded unmilled technology

- ImerCare™ 190P-Scrub
- ImerCare™ 270P-Scrub
- ImerCare™ 400P-Scrub
- ImerCare™ 800P-Scrub

Imerys perlite range

IMERCARE
PARTS

ImerCare™ 20P,
25P & 30P

ABSORPTION & MATTING

Particle size distribution
D50 from 20µm to 30µm



ImerCare™ 90P,
120P & 190P-Scrub

SOFT EXFOLIATION

Particle size distribution
D90 from 90µm to 120µm



ImerCare™ 270P
& 400P-Scrub

EXFOLIATION

Particle size distribution
D90 from 270µm to 400µm



ImerCare™
800P-Scrub

EXFOLIATION

Particle size distribution
D90 at 800µm



SKIN CARE

Sebum control (acne cream)
Matting effect (face cream)
Reduced tacking (suncream)

MAKE UP

Transparent matt (no coverage)
Long lasting (sebum/sweat)

TOOTH CARE

Gentle abrasion

HAIR CARE

Anti dandruff shampoo

SKIN CARE

Soft facial exfoliation

BODY HYGIENE

Exfoliating shower gels
and polyethylene substitution

BODY HYGIENE

Bar soap
Strong exfoliation