chromohance™ 113 polymer

picture perfect color that lasts

INCI name: Polyquaternium-113

description

ChromoHance™ 113 patented polymer shields color-treated hair from surfactant stripping by forming a hydrophobic surface on each strand, reducing water absorption during washing and slowing the fading process.

A range of color-protection products help to slow the rate of color fade, but few products exist to maintain the "just-out-of-the-salon" look. Typically, leave-in products with color-protection technology provide some level of protection. In rinse-out systems, commercial color-protection technology offers only a marginal benefit. As the market shifts toward a shampoo, conditioner and styling regimen; however, higher-performing technology is required to assure color maintenance from rinse-out systems.

key features

- provides superior color retention and anti-fade, anti-wash out for all colors
- long-lasting conditioning and repair
- improves vibrancy and shine
- effective in all formats (shampoo, conditioner, masques, serum treatments)
- compatible and stable with most other ingredients and formulations
- new chemistry, new Polyquaternium (Polyquaternium-113)
- easy to process

Color-treatment processes, such as oxidative dyeing tend to remove the hydrophobic layer from the hair surface. Without a hydrophobic surface, dye molecules leach out faster from hair fibers during typical washing and conditioning practices with surfactant-containing products. ChromoHance™ 113 polymer restores a hydrophobic shield, aiding in the preservation of color vibrancy and significantly reducing leakage of color molecules.

applications

- shampoos
- conditioners/masks
- treatments
- stylers
- hair colors

proven in rinse-out and leave-in systems

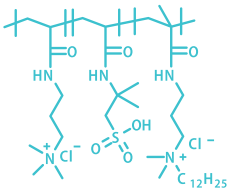
An easy-to-use clear aqueous solution, the polymer is proven useful in both rinse-out and leave-in systems at low-use levels. ChromoHance™ 113 polymer is compatible with most hair care formulations and ingredients at levels that range from 1 to 5% (as sold).

color conservation of red hair

Red hair dye is by far the most difficult color to guard against wash-out and color-fade. Using a commercial permanent red hair color as a test case, the anti-fade performance of this oxidative dye is tested during a shampoo and conditioner regimen containing 1% active level ChromoHance™ 113 polymer.

Comparing the same shampoo and conditioning regimen with and without ChromoHance™ 113 polymer, over 10 cycles, a significant improvement in anti-color fade is observed.

chemical properties



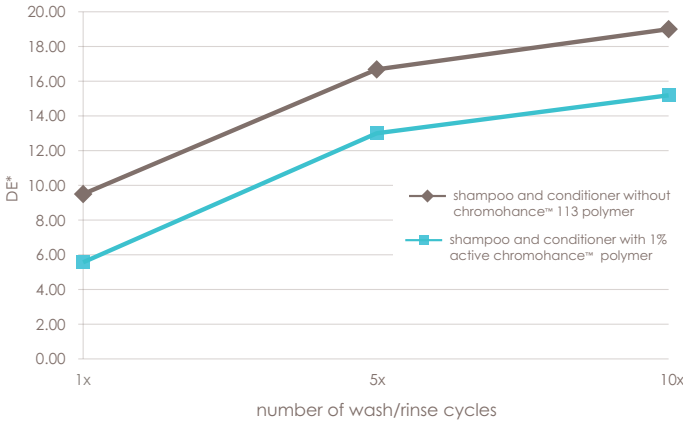
properties of chromohance™ 113 polymer:

Color maintenance technology for oxidative color-treated hair.

INCI: Polyquaternium-113
clear aqueous solution (20% solids)

pH at 25 °C: 3.5–4.5
Brookfield Viscosity, cps: 400–1400 mPas
Usage level: 1–5%

figure 1: anti-fade of market leading red colorant (Hot Red) (4R)

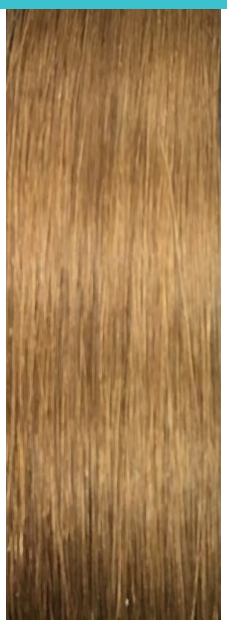


color protection performance with various hair dyes

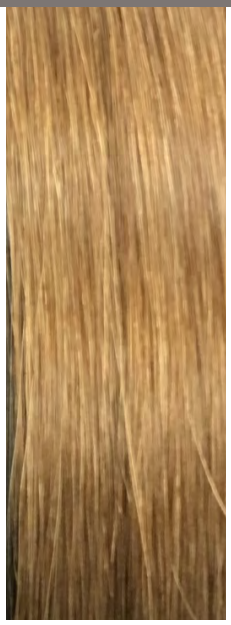
figure 2: dyed platinum bleached hair after 10x shampoo and conditioner regimen

medium golden brown

with chromohance™ 113



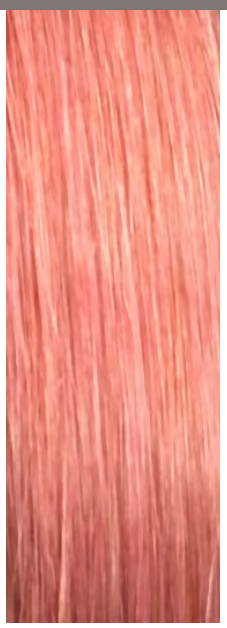
without chromohance™ 113



red hot red

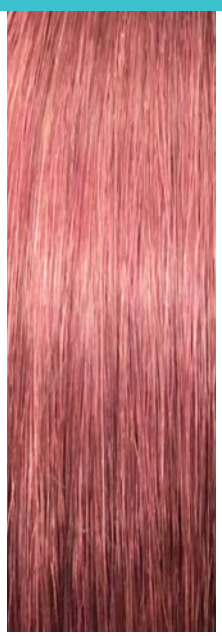
with chromohance™ 113

without chromohance™ 113

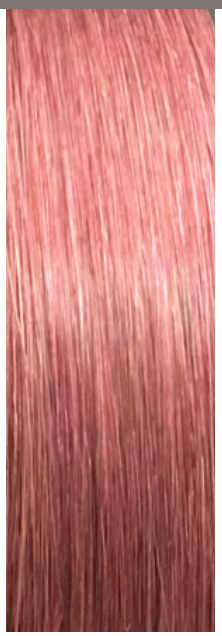


light brown violet extra

with chromohance™ 113

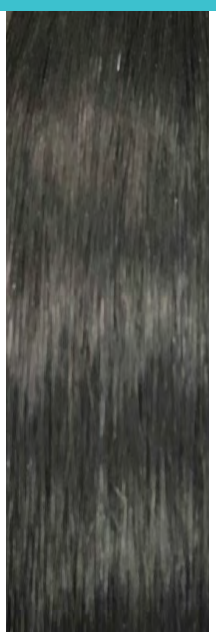


without chromohance™ 113

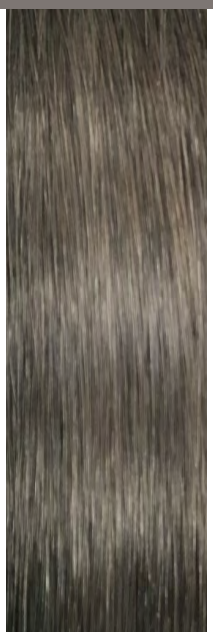


sapphire black

with chromohance™ 113



without chromohance™ 113



hyperspectral imaging and VISIA-CR* imaging

figure 3: high tech optical imaging techniques used to demonstrate and validate the color protection

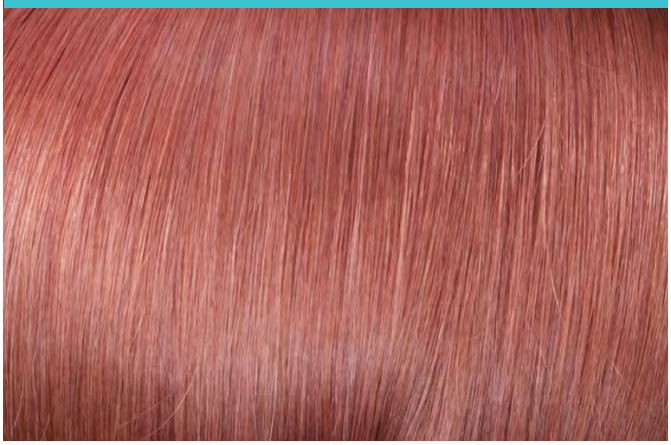
VISIA-CR* imaging system was used with mannequins to take digital images of the hair surface under controlled and reproducible conditions. It is a complementary method to visualize and track progression of color fading over time. In this study, one side of the mannequin was washed with shampoo and conditioner regimen containing ChromoHance™ 113 polymer, the other side with regimen without ChromoHance™ 113 polymer.

With hyperspectral imaging, it is possible to monitor specific dyes to show which are fading faster. The hyperspectral image analyses show the coloration pigment absorption bands at 480-530 nm (red coloration) from the chroma (internal reflection) region on the mannequin heads. Absorbances can be followed over time as pigments leach out from hair with repeated cycles of shampoo + conditioner.

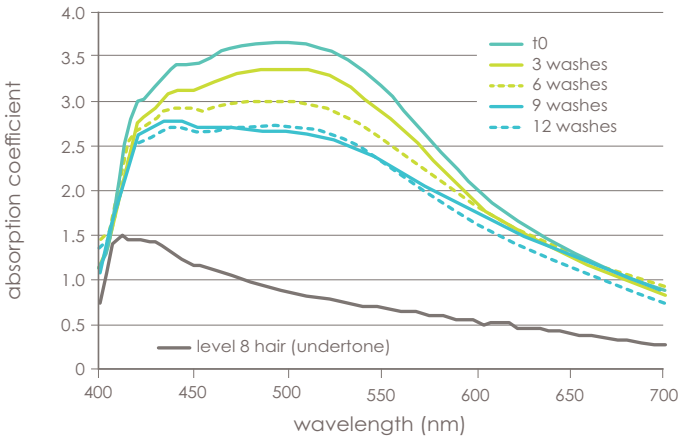
ChromoHance™ 113 polymer slows down the loss of pigments from inside hair fibers as shown by higher light absorbances than washes with control formulas. Pigment light absorption contributions can be compared to the absorption from the bleached hair and used as substrate prior to coloration.

without chromohance™ 113

with chromohance™ 113



without chromohance™ 113



with chromohance™ 113

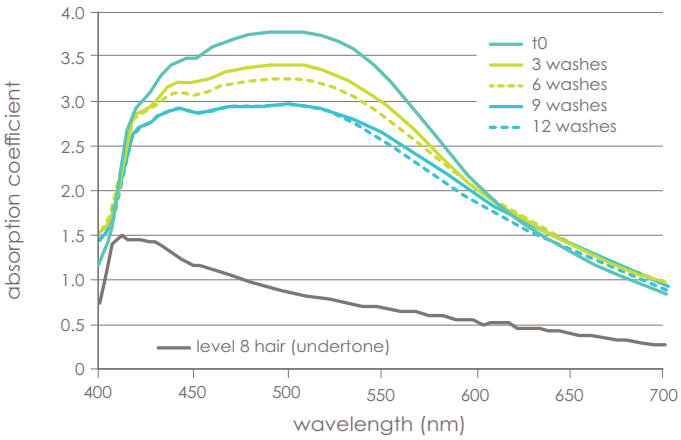
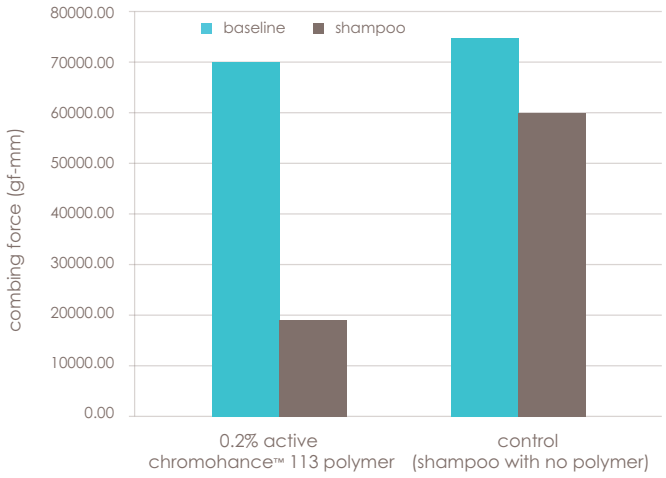


figure 4: root-to-tip conditioning

A multifunctional technology, ChromoHance™ 113 polymer offers root-to-tip conditioning to help rejuvenate every strand of color-treated hair, and at the same time, assure maintenance of color vibrancy.



formulating shampoo and conditioner with chromohance™ 113 polymer

Ashland offers the following procedures to help simplify the manufacture of shampoo and conditioner formulas containing ChromoHance™ 113 polymer.

shampoo

- dilute polymer (start with 2:1 water: polymer)
- add at the end of the batch (after all other ingredients have been added)

conditioner

- compatible with cationic surfactants
- can be added at the beginning of the batch to water phase, or end of the batch
- if added in the beginning, it will reduce viscosity
- if added at the end, conditioner will be thicker
- may impact stability of the formula (stability is formulation dependent)

Ask how ChromoHance™ 113 polymer enhances the "just-out-of-the-salon" look and feel of hair when delivered from rinse-off and leave-in formulations.

Contact your Ashland representative for test data, prototypes, and polymer samples.

consumer-perceivable hair color maintenance

In panel studies, consumers perceive color maintenance, conditioning and shine across a range of color shades when following a shampoo and conditioning regimen with formulations containing ChromoHance™ 113 polymer. When compared with control formulations containing no polymer, consumers observe a very significant improvement in maintenance of color vibrancy.

chromoclear™ color protection shampoo

formula # 346-84
material # 909400

ingredients/trade name	INCI name	%w/w	supplier
phase a			
deionized water	Aqua	ad 100%	local
dissolvine® GL 38*	Tetrasodium Glutamate Diacetate	0.10	Akzo Nobel
timiron® MP1001*	Mica, Titanium Dioxide	0.10	Merck
chromohance™ 113 polymer	**Polyquaternium-113**	**2.50**	**Ashland**
cocamidopropyl etaine (30%)	Cocamidopropyl Betaine	6.67	local
emal® 228D (28%)*	Sodium Laureth Sulfate	21.43	Kao
emal® 228D (28%)*	Sodium Laureth Sulfate	21.43	Kao
phase b			
deionized water	Aqua	20.00	local
Ashland™ 980 carbomer	**Carbomer**	**0.40**	**Ashland**
phase c			
optiphen™ 200 preservative	**Phenoxyethanol (and) Caprylyl Glycol**	**0.80**	**Ashland**
Nutritic karite*	Parfum	0.50	Robertet
clearhance™ C conditioning polymer	**Cassia Hydroxypropyltrimonium Chloride**	**0.20**	**Ashland**
phase d			
ceraphyl™ 60 ester	**Quaternium-22**	**0.50**	**Ashland**
belsil® ADM 8301E*	Amodimethicone/Morpholinomethyl Silsesquioxane, Trideceth-5, Glycerin	1.50	Wacker
xiameter® MEM 1788*	Dimethiconol (and) TEA-Dodecylbenzenesulfonate	2.50	Xiameter
phase e			
sodium hydroxide 33%	Sodium Hydroxide	0.30	local
sodium chloride	Sodium Chloride	1.00	local
total		**100.00**	

* Trademark owned by a third party resin solids % / total styling polymer solids 1.0%.

procedure

1. **phase a:** Add the first 5 ingredients in the right order and wait after the addition of the Cocamidopropyl Betaine till the polymer is completely hydrated before continuing with the SLES (white haziness occur). Add the first portion of SLES, wait 5 minutes and add the second portion of SLES.
2. **phase b:** Dissolve the Carbomer in water until lump free and add to phase a
3. **phase c:** pre-disperse the Clearhance™ C in the perfume and Optiphen™ 200 and add to the mixer.
4. **phase d:** Add the ingredients in order with good stirring.
5. **phase e:** Adjust the pH with Sodium Hydroxide 33% and Sodium Chloride to the desired pH and viscosity.

color shield weightless leave-in conditioner

formula # 12696-8.7A
material # 909807

ingredients/trade name	INCI name	%w/w	supplier
phase a			
deionized water	Aqua	85.16	local
glycerin*	Glycerin	0.20	Jeen
fiberhance™ BM solution	**Hydroxypropyl gluconamide (and) hydroxypropyl ammonium gluconate**	**1.00**	**Ashland**
chromohance™ 113 polymer	**Polyquaternium-113**	**5.00**	**Ashland**
styleze™ W17 polymer	**Polyquaternium-55**	**5.88**	**Ashland**
optiphen™ 200 preservative	**Phenoxyethanol (and) Caprylyl Glycol**	**0.60**	**Ashland**
amphosol® CA*	Cocamidopropyl Betaine	0.58	Stepan
chromafend™ biofunctional	**Water (Aqua) (and) Glycerin (and) Hydrolyzed Linseed Extract**	**1.00**	**Ashland**
0.1% D and C red No. 33 aq. solution*	Aqua (and) (CI 17200)	0.08	Pylam
phase b			
jeechem CAH-40*	PEG-40 Hydrogenated Castor Oil	0.30	Jeen
petal blanche*	Parfum	0.20	Firmenich
total		**100.00**	

* Trademark owned by a third party resin solids % / total styling polymer solids 1.0%.

procedure

1. Add water to main vessel and begin mixing. Hold a small amount to rinse Phase B.
2. Add the rest of phase a ingredients in the order listed waiting for each to become uniform in solution before adding the next.
3. Premix phase b ingredients in a side container and mix until clear. Add to batch with mixing. Rinse container with remaining water. Mix until uniform.

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