Silicone Technologies Bring High Performance Solutions to Ethnic Hair

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Abstract

Deep conditioning, perceived repair, shine, protection from heat and the ability to minimize the effects of harsh chemicals in hair straightening processes remain key attributes to be obtained from ethnic hair care products. This paper focuses specifically on the needs of African-American hair and on new silicone technologies that can help formulators create next-generation products that offer multifunctional solutions for consumers.

Aminopropyl phenyl trimethicone is based on a silicone resin technology. This multi-functional, high refractive index liquid resin offers benefits for hair styling and maintenance. The amino functionality enhances deposition on the hair, the phenyl functionality helps impart shine, and the resin structure improves substantivity. This material can also protect hair from damage related to heat treatments. Because the material is also stable in an alkaline environment, it is suitable for formulating in relaxers and colorants.

A quaternary ammonium silicone technology features a microemulsion of a newly patented quaternized amino-functional silicone polymer. For formulating water-based leave-on or rinse-off conditioners, silicone quaternium-16 delivers superior hair softness without greasiness. It also protects hair from heat treatments.

Introduction

Over the past two decades, technology for hair care products has evolved significantly, allowing the market to grow and offer a range of differentiated products designed for the distinctive hair structure and grooming techniques of various consumer groups. Silicones have played a major role in product development[1], in part because of their ability as conditioning agents for softness and manageability, but also because they impart shine. Superior conditioning properties are particularly important to African-American hair, with its tighter curls and coarser texture than Caucasian hair, as well as its thinner, more variable and elliptical diameter. Because African-American hair also tends to tangle, knot and break easily, mechanical forces such as combing can easily damage the fragile hair. Thermal treatments and chemical applications such as relaxers and colorants compound these effects.

Soft feel, conditioning effects, shine and protection from heat remain key attributes to be obtained from ethnic hair care products, particularly for those who prefer to straighten or colour their hair. This article focuses specifically on the needs of African-American hair and on new silicone technologies that can help formulators create next-generation products that offer multifunctional solutions for consumers.

Options for Long-Lasting Shine

Amino-functional silicones are well known in the hair care industry for their ability to improve deposition on negatively charged hair[2]. A patented silicone resin[3,4] with the INCI name aminopropyl phenyl trimethicone[a] contains both amino- and phenyl-functional groups. The phenyl group imparts shine due to its high refractive index, and the liquid nature of the resin provides good film-forming capabilities to help ensure efficacy and uniformity once it is delivered onto the hair. Furthermore, because it is able to withstand a high pH environment, the silicone resin can be incorporated into relaxers and permanent wave formulations.

The aminopropyl phenyl trimethicone can be used in anhydrous formulations as well as in water-based formulations, as demonstrated in the prototype formulations in this article. Water-based formulations can be achieved by emulsifying the resin with the oil phase or by pre-emulsifying the resin and then adding the emulsion to the water phase.

Evaluation for shine was done on a variety of hair tress samples including European slightly bleached blonde, European virgin brown, frizzy[b] and Oriental hair. Hair tresses were treated with 2% by weight aminopropyl phenyl trimethicone in cyclopentasiloxane, 2% by weight phenyl trimethicone, and 2% by weight aminopropyl phenyl trimethicone in emulsion form delivered in deionized water, respectively. For sample tress preparation, a tress was placed

[a]Dow Corning® 2-2078 Fluid.

[b]An African-American hair, given this designation by its supplier, International Hair Importers, Bellerose, NY.