Polyquaternium-69: A New Fixative Polymer with Enhanced Styling Benefits

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Abstract

PVP and PVP/VA have long been the mainstay of traditional styling gels and mousses but the rapid release of new hair care launches and the drive for product differentiation on the shelves has created demand for expanded performance of styling resins. In order to achieve improved performance, a new polymer has been designed by polymerization of vinyl pryrrolidone, vinyl caprolactam, DMAPMA, and the alkylated quaternary $DMAPMA^{+}$- $C_{12}H_{25}CL^{-}$, INCI designation - Polyquaternium-69 (AquaStyle™ 300). Improvements have been achieved in humidity resistance, shine, frizz control and mechanical properties without compromising basic attributes such as gel clarity, stability, mousse foam properties, and low VOC requirements. Polyquaternium-69 is a hydrophobic polymer, yet water soluble and predominately non-ionic with a weakly cationic nature providing a broad range of compatibility with cosmetic ingredients including anionic gellants. Polyquaternium-69 can be easily incorporated into various styling products such as clear and cream gels, aerosol and non-aerosol mousses, styling lotions, and sprays.

Performance data on this polymer and formulations substantiate the efficacy of these various applications. Specifically, improved water resistance for strong hold has been demonstrated by high humidity curl retention. The enhanced mechanical properties have been characterized by texture analysis and supported by both subjective panel and Salon testing. Increased shine and anti-frizz effects are captured using digital image analysis.

Introduction

Competition is heating up in the hair care market. 1,322 products were launched globally in 2006 in the hair styling category alone. Styling trends range from 'Bed Head' to 'Wet Looks' to 'Spiked Hair' to 'Natural Look'. Each product is launched for a particular target market that has been carefully studied by market researchers. In such a dynamic world, formulators increasingly face the challenge to create formulas that provide unique performance benefits in a cost-effective manner.

Polyvinylpyrrolidone (PVP) and copolymers of vinyl acetate or acrylates (VA) are some of the active ingredients commonly used in hair fixative and styling products to provide 'hold' or 'stiffness' to the hair. In addition, they provide formulation flexibility when used in combination with polyacrylate type gellants such as carbomer. However, consumers want more. Styling products need to provide all day hold and durability of hold after a mechanical action such as combing and maintain hair style under high humidity. To address this market demand, we have developed a new polymer by copolymerizing vinyl pyrrolidone and vinyl caprolactam with quaternized and alkylated moieties. This new polymer is Polyquaternium-69 (AquaStyle™ 300).

Study results reported in this article demonstrate that AquaStyle™ 300 provides enhanced styling benefits compared to traditional systems in styling products including clear and cream gels, aerosol and non-aerosol mousses, styling lotions and sprays.

Summary of key benefits in styling applications:

- More durable and elastic hold
- Increased shine and lustre
- Reduction of frizz
- Excellent high humidity curl retention
- Synergistic with hydrophobic gellants
- Extremely low flaking
- Broad raw material compatibility