

Enhancing Sun Care Using Bentone® Hectorite Clay Technology

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Abstract

Recent studies have shown that Bentone® hectorite clay technology offers multiple benefits for today's sun care formulations beyond just thickening. Data has proven its benefits for both formulators and consumers, such as improved product physical stability and rheological properties, enhanced SPF protection and water resistance and modified product texture with good spreadability. Representative formulations demonstrated that hectorite clay technology provides formulation versatility and is easy to use in various sun care products.

Introduction

UV protection is now widely applied in various personal care formulations. Among different product forms, emulsions continue to be the most popular of all formulation vehicles for sun care products. Organic and inorganic actives are being used separately and in combinations as desired. Protection from both UVB and UVA has become the new standard. Besides sunscreen actives, product rheology is of great importance in sunscreens.

Driven by new and differentiated performance claims, sun care product manufacturers have been continuously working on product innovations. However, some fundamental sun care formulation needs still remain. No matter what innovative product is being created, the most basic but critical formulation need is to ensure product physical stability. Achieving elevated temperature stability can sometimes be a challenge. Suspending inorganic actives is essential with the increased use of physical sunscreens.

A main formulation need is to enhance SPF with the least amount of actives. It is generally believed that formulation rheology has a major effect on the SPF, and high product performance relies on uniform and thick distribution on the skin. In addition, for better UV protection, most sun care products require certain levels of SPF water resistance.

For sunscreens, improving product application properties is a formulation need directly related to product performance. Improved

product texture is always desired. Immediate protection upon applying a sunscreen is a goal to achieve. Good skin spreadability is necessary for more instant and even protective films.

The Bentone® Hectorite Clay Technology presented in this paper is proved to be able to enhance sun care formulations by responding to the formulation needs described above.

Hectorite Clay Technology

Hectorite clay is a naturally occurring material with the structural formula $\text{Na}_{0.33}[\text{Mg}_{2.67}\text{Li}_{0.33}]\text{Si}_4\text{O}_{10}[\text{OH}]_2$. Bentone® hectorite clay technology is based on this unique swelling clay. The hydrophilic clays Bentone® MA, EW, and LT contain highly refined hectorite clay. These products can be delaminated in water and form a gel network structure. They are suitable for use in the aqueous phase of sun care formulations.

By reacting hydrophilic clay with quaternary ammonium compounds, Bentone® organoclays are produced for use in the oil phase. The organoclay Bentone® 38 VCG (INCI name: disteardimonium hectorite) is for organic systems with low to medium polarity, while Bentone® 27 VCG (INCI name: stearalkonium hectorite) is for medium to high polarity systems. These organoclay powders need to be properly dispersed and activated in organic solvents before incorporating them into formulations.

The Bentone Gel® products are optimally dispersed and activated pre-dispersions of hectorite organoclays. They are more suited for sunscreen formulations than the organoclay powders due to ease of use and optimal performance results. Bentone Gel® is typically comprised of one or more organic solvents, a hectorite organoclay (Bentone® 38 VCG or Bentone® 27 VCG) and an organic activator. A wide range of Bentone Gel® products made from various commonly used cosmetic oils, esters and solvents can be selected based on each formulation need.

Fully activated hectorite clay and organoclays form gels with an open, three dimensional network of clay platelets. Such gel