

Acrylates Copolymers – Why do we Need to Neutralize them?

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Abstract

The scope of the article is to provide a quick guide to a recurring question: “Neutralization of acrylates copolymers, how and why?”. A basic explanation on why it is necessary to neutralize this particular class of polymers is provided, as well as a specific example (Luvimer Pro55).

Introduction

Polymers containing acrylate monomers are used extensively in hair styling, particularly hair sprays. To achieve optimal performance and stability of these formulations it is important to properly neutralize the polymer.

Typically, the acrylate copolymers used as hair fixatives have carboxylic acid groups like acrylic acid or methacrylic acid (Figure 1); those acidic groups can be neutralized during the preparation of the raw material or during the making of the aerosol concentrate mixture or other styling formulas involving these ingredients.

Neutralization of the carboxylic acid groups of the polymer has the function of increasing the water solubility of the polymer and it is also very important to provide good removability of the hair fixative from the hair during regular shampoo cycles.

Generally the polymers are provided in the acidic form and need neutralization. When this is the case, part of the specification of the raw material is the acid value (expressed as mg of KOH needed to neutralize 1g of raw material). The equation used by BASF for calculating the amount of neutralizer is:

$$N = (x \cdot y \cdot z \cdot A) / 100$$

N = quantity of neutralizing agent (g)

x = quantity of polymer raw material (Kg)

y = acid value for the polymer (mg/g)

z = degree of neutralization ($0 < z < 100$)

A = factor for each specific neutralizer (no units)

Luvimer® Pro55 (INCI Name: Acrylates Copolymer, shown in Figure 1) is a hair fixative ingredient designed for 55% VOC aerosol, pump sprays and spritzes; the author will use this product as an example of a polymer that is neutralized during formulation.

General Characteristics

This is an acidic polymer that has been specifically designed for 55% VOC aerosol sprays, it has a good crunchy hold and

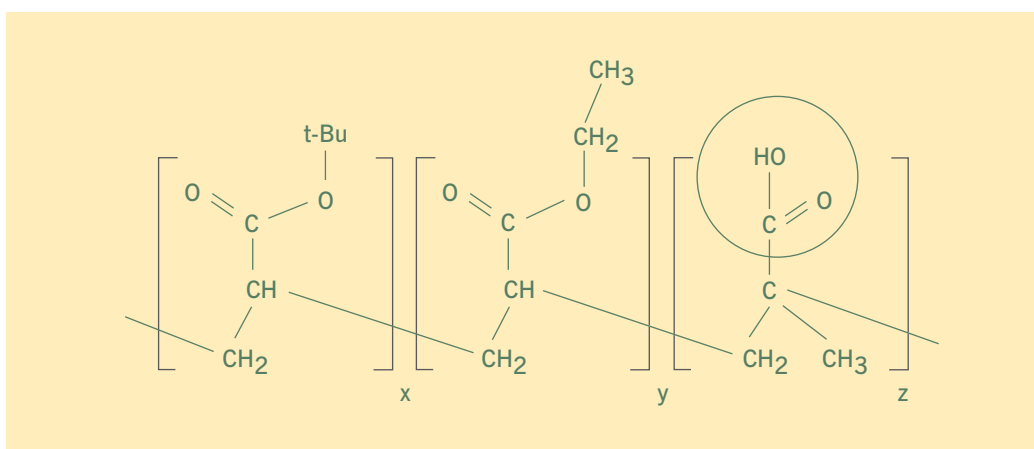


Figure 1: An example of Acrylates Copolymer