

POLYMERIC SOLUTIONS IN COSMETIC INDUSTRY

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Commercially available polymers AculynTM 22 and AculynTM 33 are used in shampoos, cleaners, shower gels, skin masks, moisturizing creams, lotions and hair colorants [1]. We explored the possibility of using these polymers as foaming agents in cosmetics applications such as hair colorants. Human hair are natural fibres and they are covered by cuticles, which form an outer layer of overlapping flattened cells. This layer is porous and covers an inner core of cortical and medullary cells. The cuticles are of great importance in cosmetic research since most hair care products including hair shampoos, conditioners and dyes essentially interact with the cuticles.

Hair care products are expected to spread well over hair so that they can wet large contact area on hair. That means that hair care products should show lower contact angle on hair. There is no published research on spreading of polymer emulsions on bunch of hair, in spite of intensive studies on behaviour of hair care products on individual hair. However, measurements on a single hair fibre could not be representative for investigation of measurements of contact angle and wettability of a bunch of hair.

Here we present experimental study of wetting properties of Aculyn solutions on hair. Measurements of wetting behaviour of droplets of polymer solutions on a bunch of hair are measured as a function of process time on hair. The wetting process includes penetration inside the bunch, spreading, wetting, and possible evaporation. All these process were taken into account.

Influence of additions used in cosmetics formulations on wetting properties on hair is also reported. Pure solutions of AculynTM 22 and AculynTM 33 on hair showed higher initial contact angles and longer penetration time as compared with solutions with addition of isopropanol and sodium dodecyl sulphate. Solutions of both polymers demonstrate that high content of polymers and additions determine the wetting processes on a bunch of hair.

We also present the results of experimental investigations and numerical simulations on drainage of foams formed by solutions of Aculyn polymers and interaction of foams with porous media [2]. The influence of bulk and the surface rheology of foaming solutions on the drainage kinetics are addressed.

1. A. Bureiko, A. Trybala, N. Kovalchuk, V. Starov; Colloids Surf., A, 2014, 460, 265-271.
2. A. Bureiko, O. Arjmandi-Tash, N. Kovalchuk, A. Trybala, V. Starov; Eur. Phys. J. Special Topics, 2014; in press