Photoluminescent pigments for effect coatings on textiles

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Abstract

Textile materials with special light effects are found in several applications – as safety materials, home textiles and sportswear. Photoluminescent pigments convert non-visible UV light into visible light providing a strong optical effect. However, such pigments do not adhere to textile surfaces, so they have to be applied together with a binder system on the textile. For this, the current study evaluates three synthetic inorganic luminescent pigments and two natural mineral pigments for their capability to act as luminescent agent in effect coatings. The prepared coatings are evaluated by microscopic measurements showing a regular coating formation and an equal pigment distribution. The intensity of the fluorescent emission is determined by fluorescence spectroscopy. The preparation technique enables equal distributed effect coatings without visual defects on cotton fabrics. However, the quality of photoluminescent emission depends strongly on the type of the applied photoluminescent pigment. While the investigated synthetic pigments reached excellent emission rates, it was not possible to obtain similar effects with natural pigments to cotton fabrics. Nevertheless, by application of the synthetic pigments the possibility for photoluminescent effect coatings on textile is demonstrated and the systematic future evaluation should consider especially fastness properties – as rubbing, washing and light stability.

Keywords: luminescence, fluorescence, coatings, pigment, cotton, textile fabric

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