



The Chemical Drying Process in Alkyd Emulsion Paint Films

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Materials and Interface Chemistry

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Academic > peer-review



Abstract

This paper deals with the oxidative drying of films (dry thickness 100 nm) made of an alkyd emulsion based on a high viscosity resin. Half of the soybean fatty acids in this resin were partly conjugated. The oxidation process is studied by monitoring the disappearance of the double bonds both the conjugated and the non-conjugated cis bonds. This was achieved by using by spatially resolved Confocal Raman Microscopy. The principle and some technical limitations of Confocal Raman microscopy are briefly discussed. The effect of various driers is reported. The results show a number of interesting features. Apart from the expected rapid disappearance of double bonds near the surface, the double bonds also disappear fairly rapidly and uniformly in a slab of 60 nm at the substrate side of the film, depending on conditions. It is only slightly visible with manganese drier, pronounced with cobalt drier and very pronounced with a cobalt zirconium combination drier. Additionally, with only cobalt the conversion is also uniform in a surface slab of a thickness of 10-15 nm. The experimental data were complemented by computer simulations of the combined reaction / oxygen diffusion process. A model is presented to explain the disappearance of double bonds in the absence of new supply of oxygen. Unless a cis-cis set of double bonds, a conjugated set of double bonds can become saturated without the consumption of radical activity. On the basis of the used theoretical model, time and length scales of the diffusion reaction mechanism are discussed.

ORIGINAL LANGUAGE

English

TITLE OF HOST PUBLICATION

29th international conference, 2003 Athens conference on Coatings science and technology, July 7-11, 2003, Vouliagmeni (Athens), Greece

PAGES

201-218

PUBLICATION STATUS

Published - 2003

Fingerprint

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Paints

PHYSICS & ASTRONOMY



Drying

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Soybeans



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Laven, J., Aravindakumar-aravind, U. K., & Linde, van der, R. (2003). The Chemical Drying Process in Alkyd Emulsion Paint Films. In *29th international conference, 2003 Athens conference on Coatings science and technology, July 7-11, 2003, Vouliagmeni (Athens), Greece* (pp. 201-218)

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The drying and film formation of long oil alkyd emulsions was investigated with emphasis on loss of dry upon storage. The main reason for loss of dry was adsorption of the cobalt (drier) on pigment surfaces as a precipitated hydroxide. Titanium dioxides with alumina surface treatment and organic pigments were most detrimental to drying. Acrylate- and phosphate-based dispersants also deactivated the cobalt, presumably due to complexation and precipitation of the cobalt. Emulsions prepared with an emulsifiable cobalt drier containing 2,2'-bipyridyl (complexing agent for cobalt) showed the best r View Alkyd paint Research Papers on Academia.edu for free. The differences in the mechanical behaviour led to the evaluation of the discrepancies found in the chemical and physical properties of the different formulations studied. Save to Library. Download. The focus of this review paper is the transition metal chemistry involved in alkyd (paint) drying. A general introduction is given on the composition of a common alkyd paint and the latest insights in the structure of the dried alkyd film more. A general introduction is given on the composition of a common alkyd paint and the latest insights in the structure of the dried alkyd film are discussed. The drying of an alkyd paint is an autoxidation process catalysed by transition metal salts. Thorough investigations. Save to Library.