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ONLINE ISSN : 1880-7577

PRINT ISSN : 0021-4795

Mokuzai Gakkaishi

Vol. 53 (2007) , No. 1 p.25-33



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Physical Properties and Wood Bonding Performance of Polyvinyl Acetate Emulsion with Acetoacetylated PVA as Protective Colloid

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(Received January 11, 2006)

(Accepted August 25, 2006)

Abstract: Recently, acetoacetylated PVA (AAPVA) was introduced where part of the PVA side-chain was replaced with the reactive acetoacetyl group. A waterproof-type polyvinyl acetate emulsion (EPVAc) was synthesized by using AAPVA as the protective colloid of the emulsion adhesive on the basis of investigations of the characteristics of EPVAc. Its physical properties and wood bonding performance were investigated as summarized below.

1) After heat treatments of both 20 and 60°C, the physical properties of the adhesive did not show a large change. However, when heated at 120°C for 2 hours, AAPVA self-crosslinked and E' peak temperature became high, while the reduction of E' value was less at the high temperature region.

2) Hygroscopicity and water-solubility of EPVAc films were improved with AAPVA used as a protective colloid. Furthermore, it was proven that the plasticization of films by moisture absorption and the lowering of the storage modulus by heating were moderated for EPVAc films with AAPVA used as the protective colloid.

3) The water resistance of EPVAc using AAPVA was higher than EPVAc using normal PVA, and the wood bonding performance was rapidly improved by heating at 120°C.

Keywords: acetoacetylated PVA, PVAc, dynamic viscoelastic property, crosslink, wood



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To cite this article:

Masaaki Yamada, Kinji Taki, Hiroaki Yoshida and Tatsuhiko Ezaki: Mokuzai Gakkaishi
Vol. 53, No. 1, 25-33 (2007) .

doi:10.2488/jwrs.53.25

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