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www.elsevier.com/locate/ijadhadh

PII: S0143-7496(18)30232-X
DOI: https://doi.org/10.1016/j.ijadhadh.2018.10.002
Reference: JAAD2273

To appear in: *International Journal of Adhesion and Adhesives*
Accepted date: 1 October 2018

Cite this article as: William G. Hand, W. Robert Ashurst, Brian Via and Sujit Banerjee, Curing behavior of soy flour with phenol-formaldehyde and isocyanate resins, *International Journal of Adhesion and Adhesives,* https://doi.org/10.1016/j.ijadhadh.2018.10.002

Curing behavior of soy flour with phenol-formaldehyde and isocyanate resins

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Abstract

Cost savings are realized when phenol formaldehyde (PF) and polymeric methylene diphenyl diisocyanate (pMDI) resins are partially substituted with soy flour during the manufacture of engineered woods such as oriented strand board. The interaction of soy flour with the two resins was studied through thermogravimetric analysis, Fourier transform infrared spectroscopy, and mass spectroscopy. No significant differences in the results from all three analyses were observed between neat PF and PF resin partially (up to 30%) substituted with soy flour, suggesting that chemical bonding between soy flour and PF resin was minimal. In contrast, soy flour induced major changes in the thermogravimetric and spectroscopic properties when substituted in pMDI resin because of chemical cross-linking between the two species.

Keywords

pMDI, PF, thermogravimetric, oriented strand board, adhesion

1. Introduction