www.elsevier.com/locate/ijadhadh

Synthesized amino-functionalized porous clay heterostructure as an effective thickener in waterborne polyurethane hybrid adhesives for lamination processes

Sarocha Ruanpan, Hathaikarn Manuspiya

PII: S0143-7496(17)30189-6
DOI: https://doi.org/10.1016/j.ijadhadh.2017.10.005
Reference: JAAD2071

To appear in: *International Journal of Adhesion and Adhesives*

Received date: 20 March 2017
Accepted date: 18 October 2017

Cite this article as: Sarocha Ruanpan and Hathaikarn Manuspiya, Synthesized amino-functionalized porous clay heterostructure as an effective thickener in waterborne polyurethane hybrid adhesives for lamination processes, *International Journal of Adhesion and Adhesives,* https://doi.org/10.1016/j.ijadhadh.2017.10.005

Synthesized amino-functionalized porous clay heterostructure as an effective thickener in waterborne polyurethane hybrid adhesives for lamination processes

Sarocha Ruanpan[a] and Hathaikarn Manuspiya[a,b,*]

[a] *The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok 10330, Thailand*

[b] *Center of Excellence on Petrochemical and Materials Technology, Bangkok 10330, Thailand*

*Corresponding author: H. Manuspiya. Email: hathaikarn.m@chula.ac.th;

Tel.: +66 2 218 4134; Fax: +66 2 215 4459

ABSTRACT

The use of waterborne polyurethane (WPU) adhesives with non-volatile organic compounds (non-VOCs) has essentially expanded in laminating adhesive applications due to stringent environmental regulations, including on the release of VOCs. To function well, the inferior properties of WPUs should be overcome with good adhesion and cohesion mechanisms. High-performance WPU adhesive was synthesized by incorporating an amino-functionalized porous clay heterostructure (APCH) into the WPU to increase its internal strength via formation of urea linkages between fillers and the polymer matrix, to yield an organic/inorganic hybrid adhesive with greater cohesion. Urea linkages, as characterized by Fourier-self deconvolution of the C=O stretching vibration region (1600–1800 cm^{-1}), increased with increasing APCH content. In addition, APCH significantly enhanced the adhesion properties of bonded joints together with an improved thermal stability of the adhesive,