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

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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,

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