Preparation of water-soluble, blocked diisocyanates and their use in waterborne adhesive application

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Water-soluble, bisulfite blocked diisocyanates were prepared from hexamethylene diisocyanate (HMDI) and sodium bisufite. The blocking and deblocking of the blocked HMDI was investigated by using Fourier transform infrared spectrophotometer and differential scanning calorimetry. The blocked HMDI could regenerate isocyanate groups when the temperature was higher than 80 ºC. The blocked HMDI was used as a heat sensitive curing agent for waterborne adhesives, which showed good adhesive performance and long pot life. Peel force experiment results revealed that the blocked HDMI could be deblocked above 80 ºC after drying and the regenerated isocyanate groups reacted with hydroxyl and carboxyl groups in the adhesives to produce cross-links, which afforded much improved initial adhesive strength and excellent stability against moisture.

Keywords: Blocked diisocyanate; Waterborne; Adhesive