SPECTROSCOPIC ANALYSIS OF UREA-FORMALDEHYDE RESIN WITH AND WITHOUT ACRYLAMIDE

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ABSTRACT

SPECTROSCOPIC ANALYSIS OF UREA-FORMALDEHYDE RESIN WITH AND WITHOUT ACRYLAMIDE

The urea-formaldehyde of 1.2 mole ratio were prepared with and without acrylamide. The acrylamide was used to lower the emission of formaldehyde from urea-formaldehyde resin. The effect of acrylamide on urea-formaldehyde were studied based on the chemical properties. The functional group of the pure and modified urea-formaldehyde was determine by using the Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy and the thermal decomposition of modified urea-formaldehyde were characterized by using Thermogravimetric Analyzer (TGA). The ATR-FTIR spectra of modified and pure resin show almost no difference. The addition of acrylamide cause the peak at 3329 cm^{-1} become broad due to the increase of $-NH_2$ amount. It was concluded that acrylamide was successfully introduced in the urea-formaldehyde resin. The acrylamide function in reducing formaldehyde emission during hot pressing at high temperature by forming N,N-bis(hydroxymethyl) acrylamide derivative that will be eliminate at high temperature. The TGA curve show four separate stage which is water, acrylamide, formaldehyde and urea due to the degradation of modified urea-formaldehyde resin and all the component were fully degrade at 900˚C.