Analysis of unreacted formaldehyde in precondensate for the formaldehyde emission in urea-formaldehyde resin

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Urea-formaldehyde resins lack in water resistance because of the susceptibility to hydrolysis. This need can be overcome by forming stronger network structure of urea-formaldehyde resins. The methylol formation was studied to improve reactivity of unreacted formaldehyde in urea-formaldehyde condensate. During alkaline methylolation and acid condensation, formation of methylol group was increased by reduction of unreacted formaldehyde. The amount of unreacted formaldehyde was determined by the formation of methylol group, and then we observed formaldehyde emission in urea formaldehyde resin. Formaldehyde emission of cured resin was decreased by increasing methylol group in urea-formaldehyde condensate. This result indicated that increasing formation of methylol group in urea-formaldehyde condensate could have good water resistance of cured resin due to stronger network structure.