

## **Melamine–Urea–Formaldehyde (MUF) Resin: The Effect of the Number of Reaction Stages and Mole Ratio on Resin Properties**

### **Abstract**

MUF resin is widely used as an adhesive in wood industries, coating technology, paper industries and a main material in kitchenware production. In different application, various MUF resin properties are required. The MUF resin properties are affected by several factors, for example mole ratio of formaldehyde to melamine/urea at each reaction stage and number of reaction stages where the amino compounds are reacted. Previous researches have developed MUF resin with these properties, however the formulation lack sufficient amount of melamine or urea to balance the cost and performance. Furthermore, shorter curing period could only be obtained with the help of external heat. In this research, effects of formula variation on resin properties such as resin storage stability, solubility in water and curing period at room temperature are investigated. The results showed that in 3-reaction stage of MUF resin process, the ratio of formaldehyde to urea/melamine in each reaction stage has caused significant increases in MUF resin curing period, solubility in water and resin storage stability. These formulations contains sufficient amount of melamine and urea, which lowered the cost and yet maintaining good performance as compared to melamine–formaldehyde (MF) resin.