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### 基于桐油包膜材料的包膜尿素的研究 (II) 桐油包膜混合物粘度特性的研究

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### Studies on the urea coated with tung oil as coating materials (II) Study on the Rheological behavior of tung mixture

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**摘要** 通过改变桐油混合物中P树脂与无机调理剂的含量,制备了一系列用于尿素包膜的桐油混合物,使用旋转粘度计研究了桐油混合物的粘度、粘度指数、粘度的温度敏感性,详细考察了组成和剪切速率对混合物粘度的影响.研究表明:桐油与P树脂混合物的粘度与其粘度的线性加和关系之间存在负偏差,当P树脂质量分数达到30%左右时,混合物的粘度有最小值;对于桐油/无机调理剂混合物,其粘度随无机调理剂质量分数的增加而增加,无机调理剂质量分数小于或等于25%时,混合物的粘度小于500mPa·s,无机调理剂质量分数达到50%时,混合物粘度可超过10<sup>3</sup>mPa·s;混合物的粘度指数随无机调理剂的增加而减小,引入无机调理剂后混合物粘度的温度敏感性随之增大.桐油以及桐油与P树脂的混合物(m/m=1/1)的粘度在剪切速率增加时几乎维持不变,而桐油/无机调理剂混合物的粘度则随剪切速率的增加显著降低,表现出典型的剪切变稀行为.

**关键词:** 桐油混合物 无机调理剂 粘度 组成关系 粘度指数 温度敏感性 剪切变稀

**Abstract:** A series of tung oil mixture used in urea coating were prepared by changing the content of P resin and inorganic conditioner in the mixtures. The viscosity, viscosity index and temperature sensitivity of the viscosity for these mixtures were measured using a rotational rheometer. The effects of several factors on viscosity, such as composition of the mixture and shearing rate, were investigated in detail. The results show that there is a negative deviation comparing with the linearity plus relationship for the viscosity of the mixture prepared with tung oil and P resin. When the content of P resin is about 30%, the viscosity of the mixture is minimum. For the viscosity of the mixture tung oil and inorganic conditioner increases as the increase in content of inorganic conditioner in mixture. When the content of inorganic conditioner is smaller than 25%, the viscosity of the mixture is smaller than 500 mPa·s, When the content of inorganic conditioner is up to 50%, the viscosity of the mixture may overtake 10<sup>3</sup>mPa·s. The viscosity index of the mixture decreases as the increase in content of inorganic conditioner in mixture. The temperature sensitivity index of viscosity increases when the inorganic conditioner is introduced into the mixture. The viscosity of tung oil and the mixture of tung oil and P resin((1:1)) keep nearly unchangable when the shearing rate increases. However, the viscosity of the mixture of tung oil and inorganic conditioner drops remarkably when the shearing rate increases.

**Key words:** tung oil mixture inorganic conditioner viscosity composition viscosity index temperature sensitivity shear thinning

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