

Preparation and Properties of Vinylphenyl-silicone Resins and Their Application in LED Packaging

To a 500 mL three-necked round-bottom flask equipped with a reflux condenser, a thermometer and a mechanical stirrer, vinyltrimethoxysilane (0.10 mol), phenylmethyldimethoxysilane (1.00 mol), γ -(2,3-epoxypropoxy) propyltrimethoxysilane (0.50 mol), toluene (50 mL), ethanol (50 mL) were added. The temperature of the reaction mixture was raised to 48 °C, and 60.8 g of 10% HCl was added dropwise lasting for about 2 h. Then temperature was raised to 71 °C and the reaction was continued for another 1 h. Then the reaction mixture was poured into a 500 mL separating funnel. The upper layer of aqueous solution was removed. The organic phase was washed with deionized water to neutral pH. The solution was dried over anhydrous Magnesium sulfate, and the solvent was removed under 150°C/0.09 MPa to get PVEOS in 83.7 % yield.

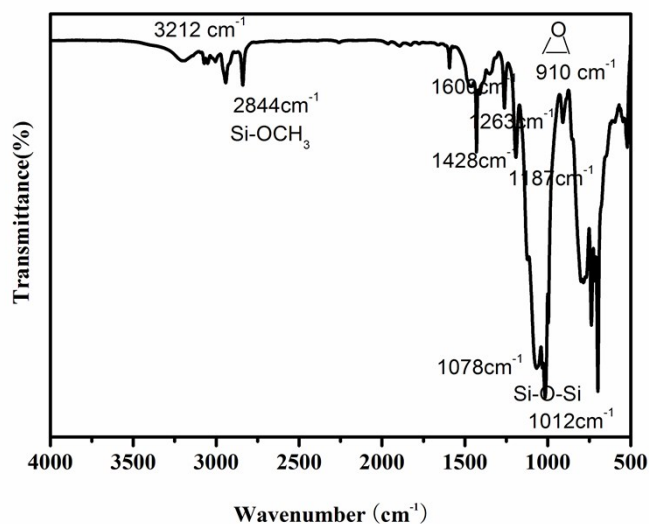


Fig. 1 FTIR spectra of PVEOS

PVEOS is a colorless, transparent liquid with a viscosity of 1872 mPa s⁻¹ at 25 °C. The Fourier transform infrared spectrum of PVEOS is shown in Figure 1. The peaks at 1078 cm⁻¹ in FT-IR spectra of the PVEO resins represent the siloxane network (Si-O-Si) from the condensation reaction, whereas the absorption peak at 1012 cm⁻¹ and 2844 cm⁻¹ indicate existence of Si-O-CH₃ groups. The weak absorptions at 910 cm⁻¹ can be ascribed to the characteristic peak of epoxy group from γ -(2,3-epoxypropoxy)propyltrimethoxysilane. The relatively sharp single band at 1428

cm^{-1} can be assigned to the characteristic peak of the phenyl group from phenylmethyldimethoxysilane. The characteristic absorption peaks of vinyl were not obvious because of their relatively low content. The refractive index of PVEOS is 1.508.