

Preparation and Properties of UV-Cured Coating Materials for Optical Fiber Coating (I)

- Primary Coating Materials -

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The relationship between chemical structure and properties of UV-cured optical fiber coating materials were observed. The coating materials are liquid compounds consisting of polyurethane oligomer, diluent and a photoinitiator. Several families of UV-cured material for primary optical fiber coating were prepared. The effect of oligomer and diluent types on their physical properties were investigated.

The storage modulus of the primary coating materials prepared in this study is in the range of 10^8 and 10^{10} (dyne/cm²) at -60 °C. The storage modulus of PBD based primary coating material is lower than that of PPG based coating materials. From the storage modulus data, it can be concluded that the PBD-based primary coating materials is an excellent material for their lower modulus. The glass transition temperature (T_g) of PBD based primary coating material is about -70 °C, while the T_g of PPG-based coating materials for primary coating is about -50 °C. T_g decreased with increasing PBD content in PBD/PPG based primary coating materials. Refractive index of primary coating material prepared is in the range of 1.38 and 1.52. Refractive index of primary coating material having PBD is above 1.46. Refractive index decreased with increasing diluent AEHE content. The viscosity of liquid un-cured resin were 200-1000 cps in the temperature range of 50 and 70 °C.