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Glass Transition and Free Volume Behavior in Epoxy-amine Network Glasses: Effect of Diamine Isomers SERGEI NAZARENKO, MUKUL KAUSHIK, MATTHEW JACKSON, JEFFREY WIGGINS, School of Polymers and High Performance Materials The University of Southern Mississippi, Hattiesburg, MS 39406 — A systematic investigation of the effect of meta and para isomers of diamino diphenyl sulfone (DDS) crosslinker on glass transition temperature (T_g) and free volume properties of DGEBF based epoxy-amine network was carried out. The pressure volume temperature (PVT) properties were measured experimentally from 0 to 120 MPa and 30 °C to 240 °C in a high pressure dilatometer-type PVT apparatus. It was observed that the glass transition temperature of epoxy system with para isomer is higher than the one consisting of meta isomer by 30 °C. PVT data were also fitted using Simha-Somcynsky, equation of state to calculate occupied and free volume. Positron annihilation lifetime spectroscopy (PALS) was used to calculate average hole free volume below and above glass transition temperature. The average free volume size in para isomer cured systems is larger than in meta isomer cured systems below their glass transition temperature, while in the melt state they are the same.

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