

**Phase Behavior of Poly(ethylene-co-octene)
- Ethylene - Hydrocarbon Mixture**

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Poly(ethylene-co-octene) (PEO) is a new thermoplastic elastomer that has a wide variation in mechanical, thermal, elastomeric, and physiochemical properties. PEO is ethylene-based copolymer, therefore its compatibility with thermoplastic olefins is expected excellent. Incorporating a long octene comonomer into the backbone of PEO endows elastomeric peoperties to the copolymer. PEO can be used to improve impact properties and resistance to low temperature brittleness of polyolefin. The hexane group pending at the backbone of PEO reduces the crystallinity and increases the flexibility of the copolymer. Since PEO is a copolymer, properties of PEO vary not only with the molecular weight and the degree of chain branching but also with composition of octene in PEO. In this study, we will present the phase behavior for the mixtures of PEO-liquid hydrocarbon solvents up to 2000 bar, 170°C. We determined the effect of PEO concentrations on the phase behavior in normal alkanes. The effect of solvent quality on the phase behavior of PEO-hydrocarbon mixtures is demonstrated with various alkanes and alkenes. Also, the phase behavior for the ternary mixtures of PEO-ethylene-octene will be presented at different PEO concentrations.