

Critical Solution Behavior of Ethylene + 1-Octene Binary Mixture

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In this study, we present critical solution behavior of the binary mixture comprising ethylene and 1-octene. Pressure-temperature (P-T) diagram of the binary mixture is experimentally determined at temperatures from 30 to 160 °C and pressures up to 500 bar. The P-T curves have positive slope in all mixture compositions of the binary mixture and exhibit low critical solution temperature (LCST) type transition at the experimental conditions. Pressure-composition (P-x) loops of the binary mixture are plotted using the P-T diagram. The P-x diagram shows that the single phase region of the ethylene + 1-octene mixture decreases with increasing temperatures. The critical points of the binary mixture shift to higher pressure with temperature and concentration of 1-octene. The critical mixture curve of ethylene + 1-octene mixture is presented at 1-octene concentration between 20 and 55 wt%. The Peng-Robinson equation of state is used to correlate the critical solution behavior of the mixture.