

Solubility for the CO₂ + vinyl octanoate and CO₂ + vinyl pivalate binary systems at high pressures

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Vapor + liquid phase behavior for the binary (CO₂ + vinyl octanoate) and (CO₂ + vinyl pivalate) systems at various temperatures from (313.2 K to 393.2 K) and pressures up to 21 MPa have been investigated by static-type at high pressure. The solubility curve of carbon dioxide in the (CO₂ + vinyl octanoate) and (CO₂ + vinyl pivalate) systems decrease as the temperature increases at a constant pressure. The (CO₂ + vinyl octanoate) and (CO₂ + vinyl pivalate) systems correlate with the Peng-Robinson equation of state including two (k_{ij} , n_{ij}) adjustable parameters. The critical properties of vinyl octanoate and vinyl pivalate were predicted with the Joback-Lydersen group contribution and Lee-Kesler method. RMSD for the (CO₂ + vinyl octanoate) [$k_{ij}=0.065$, $n_{ij}=-0.015$] and (CO₂ + vinyl pivalate) [$k_{ij}=0.065$, $n_{ij}=-0.012$] systems using two parameters determined at 353.2 K were 5.89 % and 5.76 %, respectively. RMSD for the (CO₂ + vinyl octanoate) and (CO₂ + vinyl pivalate) systems by two adjustable parameters determined at each temperature were 3.73 % and 3.77 %, respectively.