Article Abstract

Title:	Binary mixtures of carbon dioxide and dimethyl ether as alternative refrigerants and their vapor-liquid equilibrium data prediction
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Abstract:	Vapor-liquid equilibrium (VLE) data were predicted for the binary mixture of carbon dioxide (CO_2) and dimethyl ether (DME) at ten temperatures ranging from 273.15 to 386.56 K and pressure upto 7.9 MPa to observe this mixture's potential of COP enhancement and capacity modulation as a working fluid in a refrigeration system. Since the mixtures are zeotropic in nature and the components of the mixtures have good thermophysical properties, zero ozone depleting potential (ODP) and low global warming potential (GWP), they are considered as promising alternative refrigerants. The Benedict-Web-Rubin (BWR) and the modified Benedict-Web-Rubin (MBWR) equations of state (EoS) have been used for the prediction of VLE data. For the BWR and MBWR equations of state, respective constant binary interaction parameters have been determined by using the available experimental VLE data of CO_2/DME mixtures. The predicted VLE data have been compared with the experimental data and the data obtained from REFPROP version 8.0. Among the comparison results, BWR EoS shows good agreement with the experimental data.
Keywords:	Vapor-liquid equilibrium, Alternative refrigerant, Carbon dioxide, Dimethyl ether.