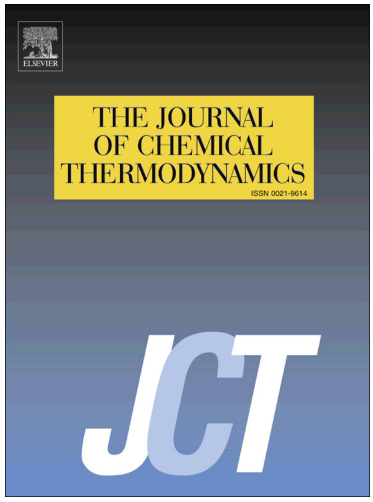

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Measurement and modelling of the viscosity of (nitrogen + carbon dioxide) mixtures at temperatures from (253.15 to 473.15) K with pressures up to 2 MPa

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ABSTRACT

The viscosity of pure nitrogen and of three (nitrogen + carbon dioxide) mixtures was measured over the temperature range from (253.15 to 473.15) K with pressures up to 2 MPa utilizing a rotating-body viscometer. The relative combined expanded uncertainty ($k = 2$) of viscosity was estimated to be between (0.14 and 0.19) % for nitrogen. For the binary mixtures, the uncertainty ranged between (0.19 and 0.39) %. The new data for nitrogen show very good agreement with experimental data from the literature and with recent *ab initio* calculations. The experimental data for the binary mixtures were compared with an Extended Corresponding States (ECS) model as implemented in the NIST REFPROP 9.1 database. The relative deviations of the data from the model were generally found to increase in magnitude with increasing density and ranged between (−2.1 and 0.4) % near the greatest density studied. The experimental data were correlated using the modified Enskog theory for hard sphere mixtures correct to the second viscosity virial coefficient. In this analysis, the effective hard-sphere diameters determining (a)

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