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Kai Kang, Xiaopo Wang

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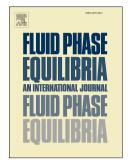
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Liquid densities for *n*-decane + *p*-xylene mixtures from 293.15 K to 1 363.15 K at pressures up to 60 MPa 2 3 Kai Kang, Xiaopo Wang* 4 Key Laboratory of Thermo-Fluid Science and Engineering, Ministry of Education, Xi'an Jiaotong 5 University, Xi'an, 710049, China 6 Email: wangxp@mail.xjtu.edu.cn, Fax: 86-29-82668789, Tel: 86-29-82668210 7 **ABSTRACT:** The experimental measurements for liquid densities of *n*-decane and *p*-xylene 8 binary mixtures were performed over the entire composition with a high-pressure vibrating-tube 9 densimeter. The temperature ranges for the present measurement were from 293.15 K to 363.15 K and the pressures were reached to 60 MPa. The experimental uncertainty is estimated to be 0.001 10 11 with 0.95 confidence level. Experimental density values were fitted by the modified Tammann-Tait equation. The PC-SAFT equation of state and Cibulka's equation was used to 12 predict the densities of *n*-decane and *p*-xylene and its mixtures. In addition, derived volumetric 13 14 properties, such as the excess molar volumes, the isothermal compressibility, and isobaric thermal 15 expansivity, were calculated from the experimental density data. The effects of pressure and 16 temperature on the derived properties were also discussed.

17 Key words: *n*-decane, *p*-xylene, high-pressure density, volumetric properties

18 1. INTRODUCTION

19 Hydrocarbons (for example, *n*-alkanes, iso-alkanes, naphthenes and aromatics) are the main 20 components of crude oil. Densities of hydrocarbons and its mixtures at reservoir conditions are 21 indispensable for accurate assessment of the recoverable petroleum amount within a reservoir. 22 Furthermore, the knowledge of accurate $p\rho Tx$ data of mixtures allows calculating the derived 23 properties, including excess molar volumes, isothermal compressibility, isobaric thermal 24 expansivity, and internal pressure. These properties can provide a good understanding the nature 25 of molecular interactions of the mixtures.

Literature survey shows that there has a great deal of density data for alkane mixtures and alkane/naphthene mixtures¹⁻¹¹. However, $p\rho Tx$ properties of alkane/aromatics mixtures are still scarce in the literature, especially at high pressures. Kapoor and Rattan reported densities for Download English Version:

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