UNIVERSIDAD DE BURGOS

http://wwww.ubu.es/english-version

LIST OF PROJECTS OFFERED TO INCOMING STUDENTS FROM THE COOPER UNION UNIVERSITY - Research Group on Energy Engineering MMT-1

Internship 1

Research Line:

Research on thermodynamic properties at high pressure and high temperature of new bio-fuels obtained from renewable sources.

Coordinator / contact person:

Dr. Natalia Muñoz Rujas (nmrujas@ubu.es).

Description:

Over the last decades the reduction of emissions during production, transportation, storage and, of course, the use of industrial fluids in engines and energy industry has become a very important worldwide objective. Considerable effort is being spent on the development of low carbon technologies, with the aim of reducing emissions. Energy industrial fluids like bio-fuels, CO_2-fluid mixtures, refrigerants, heat transport liquids, phase change materials for energy storage or lubricants present frequently a complex mixture of a large number of components that have to meet international standards and quality criteria.

Many new compounds have to been produced and developed to reduce pollutants from transportation and energy industry exhaust gases and effluents. Proponents of these new low carbon fluids claim several advantages: they improve physic and chemical properties, they can be produced from renewable agricultural and raw materials instead of fossil sources, and they reduce greenhouse gas emissions.

This project concerns with the accurate measurement, correlation and prediction of thermodynamic and transport ptoperties properties of in new low carbon energy fluids, (including but not limited to bio-fuels, CO_2-fluid mixtures, refrigerants, heat transfer fluids, lubricants, phase change materials for energy storage, etc.) such as density, viscosity, thermal conductivity, isobaric heat capacity, vapor-liquid equilibrium behaviour, water inmiscibility range, distillation curve, mixing enthalpy and heating values, at different pressure and temperature conditions.

Priority Area:

Renewable energy, sustainability

UNIVERSIDAD DE BURGOS

http://wwww.ubu.es/english-version

Student profile:

Mechanical Engineering, Chemical Engineering, B.Sc. Physics, B.Sc. Chemistry

Recent references

H. Makhlouf, N. Muñoz-Rujas, F. Aguilar, B. Belhachemi, E. A. Montero, I. Bahadur, L. Negadi, Density, speed of sound and refractive index of mixtures containing 2-phenoxyethanol with propanol or butanol at various temperatures, Journal of Chemical Thermodynamics, 2019, 128, 394-405.

N. Muñoz-Rujas, J. P. Bazile, F. Aguilar, G. Galliero, E. Montero, J. L. Daridon, Speed of sound, density and derivative properties of binary mixtures HFE-7500 + Diisopropyl ether under high pressure, Journal of Chemical Thermodynamics, 2019, 128, 19-33.

M. Darkaoui, N. Muñoz-Rujas, F. Aguilar, A. El Amarti, M. Dakkach, E. A. Montero, Liquid Density of Mixtures of Methyl Nonafluorobutyl Ether (HFE-7100) + n-Heptane at Pressures up to 80 MPa and Temperatures from 298.15 to 393.15 K, J. Chem. Eng. Data 2018, 63, 2966−2974.

G. Rubio-Pérez, N. Muñoz-Rujas, A. Srhiyer, E. A. Montero, F. Aguilar, Isobaric vapor-liquid equilibrium, density and speed of sound of binary mixtures 2,2,4-trimethylpentane þ 1-butanol or dibutyl ether (DBE) at 101.3 kPa, Fluid Phase Equilibria, 2018, 475, 10-17

M. Dakkach, N. Muñoz-Rujas, F. Aguilar, F. E. M. Alaoui, E. A. Montero, “High pressure and high temperature volumetric properties of (2-propanol þ di-isopropyl ether) system”, Fluid Phase Equilibria 2018, 469, 33-39.

N. Muñoz-Rujas, F. Aguilar, J.M. García-Alonso, E. A. Montero, “High pressure density and speed of sound of hydrofluoroether fluid 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-(trifluoromethyl)-pentane (HFE-7300)”, Journal of Chemical Thermodynamics, 2018, 121, 1-7.

A. Srhiyer, N. Muñoz-Rujas, F. Aguilar, J. J. Segovia, E. A. Montero, High pressure volumetric properties of the binary mixtures di-isopropyl ether + 2,2,4-trimethylpentane, Journal of Chemical and Engineering Data, 2017, 62, 3610-3619.

N. Muñoz-Rujas, J. P. Bazile, F. Aguilar, G. Galliero, E. Montero, J. L. Daridon, Speed of sound and derivative properties of diisopropyl ether under high pressure, Fluid Phase Equilibria 2017, 449, 148-155.

A. Srhiyer, N. Muñoz-Rujas, F. Aguilar, J. J. Segovia, E. A. Montero, High pressure liquid densities and excess volumes of the (di-isopropyl ether + 1-hexanol) system, Journal of Chemical Thermodynamics 2017, 113, 213-218.

N. Muñoz-Rujas, J. P. Bazile, F. Aguilar, G. Galliero, E. Montero, J. L. Daridon, Speed of sound and derivative properties of hydrofluoroether fluid HFE-7500 under high pressure, Journal of Chemical Thermodynamics 2017, 112, 52-58.

E. A. Montero, F. Aguilar, N. Muñoz-Rujas, F. E. M. Alaoui, Thermodynamic properties of propanol and butanol as oxygenate additives to biofuels", in Eduardo Jacob-Lopes and Leila Queiroz Zepka (Eds.) Frontiers in Bioenergy and Biofuels, 2017, InTechOpen, Rijeka (Croatia), ISBN 978-953-51-2892-2, Print ISBN 978-953-51-2891-5,. DOI: 10.5772/66297

M. Dakkach, F. Aguilar, F. E. M. Alaoui, E. A. Montero, Liquid densities and excess volumes of biofuel mixtures: (2-butanol + di-isopropyl ether) system at pressures up to 140 MPa and temperatures from 293.15 K to 393.28 K, Journal of Chemical Thermodynamics 2017, 105, 123-132.

F. E. M. Alaoui, F. Aguilar, M. J. González-Fernández, E. A. Montero, Excess enthalpies of ternary mixtures of (oxygenated additives + cycloalkane) in fuels and bio-fuels: (dibutyl ether + 1-propanol + cyclohexane), or methylcyclohexane, at T = (298.15 and 313.15) K, Journal of Chemical Thermodynamics 2017, 105, 112-122.