

## **Proyectos de investigación vivos en el curso 2007-2008.**

Título: Mejora de carburantes líquidos y gaseosos para el transporte, su almacenamiento y distribución: uso de combustibles renovables líquidos y de mezclas gaseosas con hidrógeno.

Investigador principal: Miguel A. Villamañán Olfos

Dpto. Ing. Energética y Fluidomecánica. Universidad de Valladolid.

Dirección General de Investigación. Plan Nacional I+D+I. Ministerio de Ciencia y Tecnología. ENE2006-13349/CON

Título: Caracterización termodinámica de los nuevos combustibles renovables en el transporte.

Investigador principal: José J. Segovia Puras

Dpto. Ing. Energética y Fluidomecánica. Universidad de Valladolid.

Junta de Castilla y León. VA048A05

Título: Diseño de entornos de aprendizaje para el desarrollo de competencias en ingeniería.

Investigador principal: Rosa M<sup>a</sup> Villamañán Olfos.

Dpto. de Didáctica de las Ciencias Experimentales y Geodinámica. Escuela Universitaria de Educación de Palencia. Universidad de Valladolid.

Junta de Castilla y León. UV35/07

Título: Evaluación y desarrollo de competencias en el campo de la ingeniería termodinámica para su aplicación en el espacio europeo de educación superior..

Investigador principal: Rosa M<sup>a</sup> Villamañán Olfos.

Dpto. de Didáctica de las Ciencias Experimentales y Geodinámica. Escuela Universitaria de Educación de Palencia. Universidad de Valladolid.

Junta de Castilla y León. UV39/06

Gree/clean processing of biocative materials (probiomat)

Investigador principal: M<sup>a</sup> José Cocero Alonso.

Dpto. de Ingeniería Química y Tecnología del Medio Ambiente. Facultad de Ciencias. Universidad de Valladolid.

Proyecto Europeo MEST-CT-2004-007767

Acción complementaria para financiar la solicitud del proyecto europeo INCO-HIVALNAT

Investigador principal: M<sup>a</sup> José Cocero Alonso.

Dpto. de Ingeniería Química y Tecnología del Medio Ambiente. Facultad de Ciencias. Universidad de Valladolid.

Acciones Especiales/Complementarias. CTQ2005-25180-E/PPQ

Contribuciones al desarrollo de proyectos químicos sostenibles utilizando tecnologías limpias

Investigador principal: M<sup>a</sup> José Cocero Alonso.

Dpto. de Ingeniería Química y Tecnología del Medio Ambiente. Facultad de Ciencias. Universidad de Valladolid.

Planes Nacionales I+D/I+D+I. CTQ2006-02099

Título: Nuevos desarrollos de la tecnología de absorción en climatización a gas y refrigeración solar

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Código oficial: A/2766/05

Título: Optimización de diseño integral y de la gestión energética de sistemas avanzados de microtrigeneración en edificios

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Dirección General de Investigación. Plan Nacional I+D+I. Ministerio de Ciencia y Tecnología.

ENE2006-15700-C02-01/CON

Título: Nouveaux developpements dans la technique d'absorption en climatisation au gaz et refrigeration solaire

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Codigo oficial: A/6457/06

Título: Peixe Verde - Generación de energía y mecánica y eléctrica

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Codigo oficial: PSS-370300-2006-4

Título: Peixe Verde - Ahorro y eficiencia energética

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Codigo oficial: PSS-370300-2006-5

Título: Mezclas acuosas de nitratos y nitritos alcalinos para sistemas de climatización por absorción con accionamiento a alta temperatura

Investigador principal: Francisco Javier Esteve Agustench

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Dirección General de Investigación. Plan Nacional I+D+I. Ministerio de Ciencia y Tecnología.

ENE2007-65541

Título: Nuevos desarrollos de los sistemas autónomos de refrigeración solar

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Codigo oficial: A/9447/07

Título: Peixe Verde - Generación de Energía Mecánica y Eficiencia Energética

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Codigo oficial: PSS-370300-2007-4

Título: Peixe Verde - Ahorro y Eficiencia Energética

Investigador principal: Alberto Coronas Salcedo

Departament d'Enginyeria Mecànica. Universitat Rovira i Virgili

Codigo oficial: PSS-370300-2007-5

## **Publicaciones firmadas por los doctores del Programa de Doctorado en Investigación en Ingeniería Termodinámica de Fluidos. (R.D. 56/2005) en los últimos cuatro años.**

### **2008**

Residence time distribution studies of high pressure fluidized bed of microparticles JOURNAL OF SUPERCRITICAL FLUIDS Volume: 44 Issue: 3 Pages: 433-440 Published: 2008 Rodriguez-Rojo, S; Lopez-Valdezate, N; Cocero, MJ

Chemical recycling of carbon fibre reinforced composites in nearcritical and supercritical water COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING Volume: 39 Issue: 3 Pages: 454-461 Published: 2008 Pinero-Hernanz R (Pinero-Hernanz, Raul), Dodds C (Dodds, Christopher), Hyde J (Hyde, Jason), Garcia-Serna J (Garcia-Serna, Juan), Poliakov M (Poliakov, M)

Martyn), Lester E (Lester, Edward), Cocero MJ (Cocero, Maria Jose), Kingman S (Kingman, Sam), Pickering S (Pickering, Stephen), Wong KH

Supercritical water oxidation of feeds with high ammonia concentrations Pilot plant experimental results and modeling CHEMICAL ENGINEERING JOURNAL Volume: 137 Issue: 3 Pages: 542-549 Published: 2008 Bermejo, MD; Cantero, F; Cocero, MJ

Modeling steam distillation of essential oils: Application to lavender super oil AICHE JOURNAL Volume: 54 Issue: 4 Pages: 909-917 Published: 2008 Cerpa, MG; Mato, RB; Cocero, MJ.

Micronization processes with supercritical fluids: Fundamentals and mechanisms ADVANCED DRUG DELIVERY REVIEWS Volume: 60 Issue: 3 Pages: 339-350 Published: 2008 Martin, A; Cocero, MJ

Solubility of diisopropoxititanium bis(acetylacetonate) in Supercritical carbon dioxide JOURNAL OF CHEMICAL AND ENGINEERING DATA Volume: 53 Pages: 204-206 Published: 2008. Montequi I., Alonso E., MartínA, Cocero MJ.

"Thermodynamics of Fuels with a Biosynthetic Component. II. Vapor–Liquid Equilibrium Data for Binary and Ternary Mixtures Containing Ethyl 1,1-Dimethylethyl Ether, 1-Hexene, and Cyclohexane at T = 313.15 K ". J. Chem. Eng. Data, 53(1), 2008, págs 247-251. Villamañán, R. M.; Vega-Maza, D.; Chamorro, C. R.; Villamañán, M. A.; Segovia, J. J.

"Thermodynamics of fuels with a biosynthetic component (III): Vapor–liquid equilibrium data for the ternary mixture ethyl 1,1-dimethylethyl ether, n-heptane and 1-hexene at T = 313.15 K". Fluid Phase Equilibria, 265 (1-2), 2008, págs 12-16. Villamañán R.M., Vega-Maza, D., Chamorro C.R., Villamañán M.A., and Segovia J.J.

"High-pressure isobaric heat capacities using a new flow calorimeter". The Journal of Supercritical Fluids. In Press, Corrected Proof, Available online 1 February 2008. Segovia J.J, Vega-Maza D., Chamorro C.R., Martín M.C.

Thermodynamic modelling of a two-stage absorption chiller driven at two-temperature levels. 2008. Applied Thermal Engineering. Figueredo, G.R.; Bourouis, M.; Coronas, A.

Solubility of Aqueous Mixtures of Alkaline Nitrates and Nitrites Determined by Differential Scanning Calorimetry. 2008. J. Chem. Eng. Data 2008, 53, 403–406. Pedro Vargas, Daniel Salavera, Héctor R. Galleguillos, Alberto Coronas.

## **2007**

Gasification of charcoal using supercritical CO<sub>2</sub> at high pressures. Journal of supercritical fluids, 43, 228-235, 2007. Garcia-Serna, J; Garcia-Merino, E; Cocero, MJ

Green HAZOP analysis: incorporating green engineering into design, assessment and implementation of chemical processes. Green chemistry, 9, 2, 111-124, 2007. Garcia-Serna, J; Martinez, JL; Cocero, MJ

New trends for design towards sustainability in chemical engineering: Green engineering. Chemical engineering journal, 133, 1-3, 7-30, 2007. Garcia-Serna, J; Perez-Barrigon, L; Cocero, MJ

Application of the Anderko-Pitzer EoS to the calculation of thermodynamical properties of systems involved in the supercritical water oxidation process. JOURNAL OF SUPERCRITICAL

FLUIDS Volume: 42 Issue: 1 Pages: 27-35 Published: AUG 2007 Author(s): Bermejo, MD; Martin, A; Cocero, MJ

Direct synthesis of linalyl acetate from linalool in supercritical carbon dioxide: A thermodynamic study. Chemical Engineering & Technology, 30, 6, 726-731, 2007. Martin A, Silva V, Perez L, Garcia-Serna J, Cocero MJ.

Two-parameter model for mass transfer processes between solid matrixes and supercritical fluids: Analytical solution. Journal of supercritical fluids, 41, 2, 257-266, 2007. Lucas S, Calvo MP, Garcia-Serna J, Palencia C, Cocero MJ.

Modelling residence time distribution in chemical reactors: A novel generalised n-laminar model - Application to supercritical CO<sub>2</sub> and subcritical water tubular reactors. Journal of supercritical fluids, 41, 1, 82-91, 2007. Garcia-Serna J, Garcia-Verdugo E, Hyde JR, Fraga-Dubreuil J, Yan C (Yan, C.), Poliakoff M, Cocero MJ

Mathematical modeling of the mass transfer from aqueous solutions in a supercritical fluid during particle formation JOURNAL OF SUPERCRITICAL FLUIDS Volume: 41 Issue: 1 Pages: 126-137 Published: MAY 2007 Martin A (Martin, A.), Bouchard A (Bouchard, A.), Hofland GW (Hofland, G. W.), Witkamp GJ (Witkamp, G-J.), Cocero MJ

Co-precipitation of carotenoids and bio-polymers with the supercritical anti-solvent process JOURNAL OF SUPERCRITICAL FLUIDS Volume: 41 Issue: 1 Pages: 138-147 Published: MAY 2007 Martin A (Martin, A.), Mattea F (Mattea, F.), Gutierrez L (Gutierrez, L.), Miguel F (Miguel, F.), Cocero MJ.

Supercritical CO<sub>2</sub> impregnation of Radiata pine with organic fungicides - Effect of operating conditions and two-parameters modeling JOURNAL OF SUPERCRITICAL FLUIDS Volume: 40 Issue: 3 Pages: 462-469 Published: APR 2007 Lucas S (Lucas, S.), Gonzalez E (Gonzalez, E.), Calvo MP (Calvo, M. P.), Palencia C (Palencia, C.), Alonso E (Alonso, E.), Cocero MJ.

Modelling of the phase behaviour for the direct synthesis of dimethyl carbonate from CO<sub>2</sub> and methanol at supercritical or near critical conditions Lucas, S; Gonzalez, E; Calvo, MP, et al. JOURNAL OF CHEMICAL THERMODYNAMICS Volume: 39 Issue: 4 Pages: 536-549 Published: APR 2007 Pinero R (Pinero, Raul), Garcia J (Garcia, Juan), Sokolova M (Sokolova, Maia), Cocero MJ

Precipitation of mandelic acid with a supercritical antisolvent process: Experimental and theoretical analysis, optimization, and scaleup INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH Volume: 46 Issue: 5 Pages: 1552-1562 Published: FEB 28 2007 Martin A (Martin, Angel), Gutierrez L (Gutierrez, Laura), Mattea F (Mattea, Facundo), Cocero MJ

Separation of enantiomers by diastereomeric salt formation and precipitation in supercritical carbon dioxide - Application to the resolution of mandelic acid JOURNAL OF SUPERCRITICAL FLUIDS Volume: 40 Issue: 1 Pages: 67-73 Published: FEB 2007 Author(s): Martin, A; Cocero, MJ

Synthesis of titanium oxide particles in supercritical CO<sub>2</sub>: Effect of operational variables in the characteristics of the final product JOURNAL OF SUPERCRITICAL FLUIDS Volume: 39 Issue: 3 Pages: 453-461 Published: JAN 2007 Alonso E (Alonso, E.), Montequi I (Montequi, I.), Lucas S (Lucas, S.), Cocero MJ

Mathematical modeling of the fractionation of liquids with supercritical CO<sub>2</sub> in a countercurrent packed column JOURNAL OF SUPERCRITICAL FLUIDS Volume: 39 Issue: 3 Pages: 304-314 Published: JAN 2007 Martin, A; Cocero, MJ

Performance characteristics and modelling of a micro gas turbine for their integration with thermally activated cooling Technologies. 2007. International Journal of Energy Research. Vidal, A.; Bruno, J.C.; Best, R.; Coronas, A.

Pool boiling of ammonia/water and its pure components: Comparison of experimental data in the literature with the predictions of standard correlations. 2007. International Journal of Refrigeration-Revue Internationale du Froid. Táboas, F.; Vallès, M.; Bourouis, M.; Coronas, A.

Global solar radiation model for design of solar energy systems. 2007. Desalination. Mechlouch, R.F.; Ben Brahim, A.; Bourouis, M.; Coronas, A.

Vapor-liquid equilibrium of ammonia plus lithium nitrate plus water and ammonia plus lithium nitrate solutions from (293.15 to 353.15) K. 2007. Journal of Chemical and Engineering Data. Libotean, S.; Salavera, D.; Valles, M.; Esteve, X.; Coronas, A.

Critical review of available correlations for pool boiling heat transfer of ammonia/water mixture and its pure components. 2007. International Journal of Refrigeration-Revue Internationale du Froid. Táboas F., Vallès M., Bourouis, M., Coronas A.

## **2006**

Influence of pressure on supercritical water oxidation. Experimental results and modeling. AIChE Journal. 52 (11) . 3958 a 3963. 2006. Bermejo Roda, M Dolores; Cocero Alonso, Maria Jose.

Non-stationary model of the semi-continuous depolymerization of polycarbonate AIChE Journal. 52/12, 4186 a 4199, 2006. Piñero Hernanz, Raul; Garcia Serna, Juan; Cocero Alonso, Maria Jose

Supercritical water oxidation. Thecnical review. AIChE Journal. 52 (11), 3933 a 3951. 2006. Bermejo Roda, M Dolores; Cocero Alonso, Maria Jose.

Improvement of Soluble Coffee Aroma Using and Integrated CO<sub>2</sub> Extration Process with a Selective Removal of Pungent Volatiles by Adsorption on Activated Carbon Brazilian Journal of Chemical Engineering. 23, 197 a 203. 2006. Lucas Yague, Susana; Cocero Alonso, Maria Jose

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Effect of the Transpiring Wall on the Behavior of a SCWO Reactor: Modeling and Experimental Results . INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH 45(10) 3438 a 3446, 2006. Bermejo Roda, M Dolores; Fernandez-Polanco Fernandez de Moreda, Fernando; Cocero Alonso, Maria Jose

Modelling residence time distribution in chemical reactors: a novel generalised n-laminar model. Application to supercritical CO<sub>2</sub> and subcritical water tubular reactors. Journal of supercritical fluids. 8, 359 a 364, 2006. Garcia Serna, Juan; García-Verdugo Cepeda, Eduardo; Hyde, Jason R.; Fraga-Dubreuil, Joan; Yan, Chon; Poliakoff, Martyn; Cocero Alonso, Maria Jose.

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Destruction of industrial wastewaters by supercritical water oxidation in a transpiring wall reactor. *Waste Management*. 137, 965 a 971, 2006. BERMEJO RODA, M DOLORES ; COCERO ALONSO, MARIA JOSE

"Thermodynamics of fuels with a biosynthetic component: Vapor-liquid equilibrium data for binary and ternary mixtures containing ethyl 1,1-dimethylethyl ether, n-heptane, and toluene at T=313.15 K". *Journal of Chemical & Engineering Data*, 51 (6) (2091-2095) 2006. Rosa M. Villamañán, M. Carmen Martín, César R. Chamorro, Miguel A. Villamañán and José J. Segovia.

"Phase equilibrium properties of binary and ternary mixtures containing 1,1-dimethylethyl methyl ether, 1-propanol, and hexane at T=313.15 K". *Journal of Chemical & Engineering Data*, 51 (6) 5 (2121-2125) 2006. Cristina Alonso-Tristan, Eduardo A. Montero, Rosa M. Villamanan, César R. Chamorro, and José J. Segovia

"Vapour-liquid equilibrium of octane enhancing additives in gasolines 7: Total pressure data and GE for the ternary mixture tert-amyl methyl ether (TAME), methanol and hexane at 313.15 K". *Fluid Phase Equilibria* 245 (1) 5 (52-56) 2006. C. Alonso-Tristán, J.J. Segovia, C.R. Chamorro, E.A. Montero and M.A. Villamañán

"Experimental investigation of the vapour-liquid equilibrium of binary and ternary mixtures containing dibutyl ether (DBE), cyclohexane and toluene at 313.15 K". *Fluid Phase Equilibria* 245 (1) 6 (57-64) 2006. C. Alonso-Tristán, J.J. Segovia, C.R. Chamorro and M.A. Villamañán

"Speeds of sound in  $\{(1-x)\text{CH}_4 + x\text{N}_2\}$  with  $x = (0.10001, 0.19999 \text{ and } 0.5422)$  at temperatures between 170 K and 400 K and pressures up to 30 MPa". *The Journal of Chemical Thermodynamics*, 38, 9 (926-937) 2006. J.F. Estela-Urbe; J.P.M. Trusler; C.R. Chamorro; J.J. Segovia; M.C. Martín; M.A. Villamañán

"Measurement of the (pressure, density, temperature) relation of two (methane + nitrogen) gas mixtures at temperatures between 240 K and 400 K and pressures up to 20 MPa using an accurate single-sinker densimeter". *The Journal of Chemical Thermodynamics*, 38, 7 (916-922), 2006. C.R. Chamorro; J.J. Segovia; M.C. Martín; M.A. Villamañán, J.F. Estela-Urbe; J.P.M. Trusler.

"Vapor-Liquid Equilibrium of Binary and Ternary Mixtures Containing Isopropyl Ether, 2-Butanol, and Benzene at T = 313.15 K". *Journal of Chemical & Engineering Data*, 51, 5 (148-152) 2006. Rosa M. Villamañán, M. Carmen Martín, César R. Chamorro, and José J. Segovia

"Phase equilibrium properties of binary and ternary systems containing di-isopropyl ether + 1-butanol + benzene at 313.15 K". *Journal of Chemical Thermodynamics*, 38, 7 (547-553) 2006. Rosa M. Villamañán, M. Carmen Martín, César R. Chamorro, Miguel A. Villamañán and José J. Segovia

"Total pressure and excess Gibbs energy for the ternary mixture di-isopropyl ether + 1-propanol + benzene and its corresponding binary systems at 313.15 K". *Fluid Phase Equilibria*, 239, 5 (183-187) 2006. Rosa M. Villamañán, César R. Chamorro, M.A. Villamañán, and José J. Segovia

"Phase equilibria properties of binary and ternary systems containing di-isopropyl ether + isobutanol + benzene at 313.15 K". *Fluid Phase Equilibria*, 239, 5 (178-182) 2006. Rosa M. Villamañán, César R. Chamorro, M. Carmen Martín, and José J. Segovia

"Low-grade Coal and Biomass Co-combustion on Fluidized bed: Exergy Analysis". *Energy* 31, 15 (330-344). 2006. J.J. Segovia, M.A. Villamañán, C.R. Chamorro, J. Otero, A. Cabanilla, M.C. Martín

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Densities and Heat Capacities of the Ammonia + Water + NaOH and Ammonia + Water + KOH Solutions. *Journal of Chemical and Engineering Data*. 2006. Salavera, D.; Libotean, S.; Patil, K.R.; Esteve, X.; Coronas, A.

Cooling loads analysis of an endoreversible solar absorption refrigerator cycle. 2006. *International Journal of Exergy*. Fellah, A.; Ben Brahim,A.; Bourouis, M.; Coronas, A.

## **2005**

The influence of Na<sub>2</sub>SO<sub>4</sub> on the CO<sub>2</sub> solubility in water at high pressure Fluid Phase Equilibria 238, 220-228. 2005. Bermejo Roda, M Dolores; Martin Martinez, Angel; Peters, Cornelius J.; Florusse, I. J.; Cocero Alonso, Maria Jose.

Chemical recycling of polycarbonate in a semi-continuous lab-plant. A green route with methanol and methanol-water mixtures. *Green Chemistry* 380 a 387. 2005. Piñero Hernanz, Raúl; García Serna, Juan; Cocero Alonso, Maria Jose.

Modeling of a transpiring wall reactor for the supercritical water oxidation using simple flow patterns: comparison to experimental results. *Industrial & Engineering Chemistry Research*. 3835 a 3850. 2005. Bermejo Roda, M Dolores; Fernandez-Polanco Fernandez de Moreda, Fernando; otero Alonso, Maria Jose.

MATLAB: A powerful tool for experimental design in chemical engineering. *International Journal of Engineering Education*. 21, 676 a 682. 2005. Garcia Serna, Juan; Martinez, Jose Luis; García, Rebeca; Garcia Rodriguez, Eduardo; Aparicio, Álvaro; Cocero Alonso, Maria Jose.

Absorption of water vapour in the falling film of water-(LiBr+LiI+LiNO<sub>3</sub>+LiCl) in a vertical tube at air cooling thermal conditions. *International Journal of Thermal Sciences*. 2005. Bourouis, M.; Vallès, M.; Medrano, M.; Coronas, A.

Performance analysis of combined microgas turbines and gas fired water/LiBr absorption chillers with post-combustion. *Applied Thermal Engineering*. 2005. Bruno, J.C.; Valero, A.; Coronas, A.

Vapor-liquid equilibria of ammonia+water+potassium hydroxide and ammonia+ water+sodium hydroxide solutions at temperatures from (293.15 to 353.15) K. *Journal of Chemical and Engineering Data*. 2005. Salavera, D.; Chaudhari, S.K.; Esteve, X.; Coronas, A.

Etude d'une machine à absorption solaire sous le climat espagnol. *Revue générale du froid & conditionnement d'air*. 2005. Mechlouch, R.F.; Ben Brahim, K.; Ben Brahim, A.; Bourouis, M.; Coronas, A.