

PROF. DR. FRÉDÉRIC VOGEL

PUBLICATIONS

SCIENTIFIC ARTICLES (PEER-REVIEWED)

58. Bährle, C.; Custodis, V.; Jeschke, G.; van Bokhoven, J. A.; **Vogel, F.** In Situ Observation of Radicals and Molecular Products during Lignin Pyrolysis, *ChemSusChem* (submitted).
57. Schubert, M.; Müller, J. B.; **Vogel, F.** Continuous catalytic hydrothermal gasification of pure and crude glycerol mixtures: Autothermal operation and simultaneous salt recovery, *Industrial & Engineering Chemistry Research* (submitted).
56. Kruusement, K.; Luik, H.; Waldner, M.; **Vogel, F.**; Luik, L. Gasification and liquefaction of solid fuels by hydrothermal conversion methods, *Journal of Analytical and Applied Pyrolysis* (submitted).
55. Zöhrer, H.; De Boni, E.; **Vogel, F.** Hydrothermal catalytic gasification of fermentation residues from a biogas plant – continuous experiments, *Biomass & Bioenergy* (submitted).
54. Mosteiro Romero, M.; **Vogel, F.**; Wokaun, A. Liquefaction of wood in hot compressed water. Part 2: Modeling of particle dissolution, *Chemical Engineering Science* (accepted).
53. Mosteiro Romero, M.; **Vogel, F.**; Wokaun, A. Liquefaction of wood in hot compressed water. Part 1: Experimental results, *Chemical Engineering Science* (accepted).
52. Dreher, M.; Steib, M.; Nachtegaal, M.; Wambach, J.; **Vogel, F.** On-Stream Regeneration of a Sulfur-Poisoned Ru/C Catalyst Under Hydrothermal Gasification Conditions, *Chem. Cat. Chem.* (in press).
51. Bagnoud-Velásquez, M.; Brandenberger, M.; **Vogel, F.**; Ludwig, Ch. Continuous catalytic hydrothermal gasification of algal biomass and case study on toxicity of aluminum as a step toward effluents recycling, *Catalysis Today* 2014 223, 35-43.
50. Reimer, J.; **Vogel, F.** High Pressure Differential Scanning Calorimetry of the Hydrothermal Salt Solutions K_2SO_4 - Na_2SO_4 - H_2O and K_2HPO_4 - H_2O , *RSC Advances* 2013 3, 24503.
49. Pin, S.; Huthwelker, T.; Brown, M.; **Vogel, F.** Sulfur K-edge XANES-EXAFS Combined Study of the Effect of Protonation on the Sulfate Tetrahedron in solids and solutions, *J. Phys. Chem. A* 2013 117, 8368–8376.
48. Zöhrer, H.; Mayr, F.; **Vogel, F.** Stability and performance of ruthenium catalysts based on refractory oxide supports in supercritical water conditions, *Energy & Fuels* 2013 27 (8), 4739-4747.
47. Zöhrer, H.; **Vogel, F.** Hydrothermal catalytic gasification of fermentation residues from a biogas plant, *Biomass & Bioenergy* 2013 53, 138-148.
46. Brandenberger, M.; Matzenberger, J.; **Vogel, F.**; Ludwig, Ch. Producing synthetic natural gas from microalgae via supercritical water gasification: A techno-economic

sensitivity analysis, *Biomass & Bioenergy* 2013 51, 26-34.

45. Dreher, M.; Johnson, B.; Peterson, A. A.; Nachtegaal, M.; Wambach, J.; **Vogel, F.** Catalysis in Supercritical Water: Pathway of the Methanation Reaction and Sulfur Poisoning over a Ru/C Catalyst During the Reforming of Bio-Molecules, *J. Catal.* 2013 301, 38-45.
44. Wambach, J.; Schubert, M.; Döbeli, M.; **Vogel, F.** Characterisation of a spent Ru/C catalyst after gasification of biomass in supercritical water, *Chimia* 2012 66 (9), 706–711.
43. Müller, J. B.; **Vogel, F.** Tar and coke formation during hydrothermal processing of glycerol and glucose. Influence of temperature, residence time and feed concentration, *J. Supercritical Fluids* 2012 70 (10), 126-136.
42. Peterson, A. A.; Dreher, M.; Wambach, J.; Nachtegaal, M.; Dahl, S.; Nørskov, J. K.; **Vogel, F.** Evidence of scrambling over ruthenium-based catalysts in supercritical-water gasification, *Chem. Cat. Chem.* 2012 4 (8), 1185-1189.
41. Dreher, M.; De Boni, E.; Nachtegaal, M.; Wambach, J.; **Vogel, F.** Design of a continuous-flow reactor for in-situ x-ray absorption spectroscopy of solids in supercritical fluids, *Rev. Sci. Instrum.* 2012 83, 054101.
40. Schubert, M.; Aubert, J.; Müller, J. B.; **Vogel, F.** Continuous salt precipitation and separation from supercritical water. Part 3: Interesting effects in processing type 2 salt mixtures, *J. Supercritical Fluids* 2012 61 (1), 44-54.
39. Rouff, A. A.; Rabe, S.; **Vogel, F.** Phase Transitions in Hydrothermal K_2HPO_4 Solutions, *J. Supercritical Fluids* 2011 57 (3), 207-212.
38. Gassner, M.; **Vogel, F.**; Heyen, G.; Maréchal, F. Process design of SNG production by hydrothermal gasification of waste biomass: Process optimisation for selected substrates, *Energy & Environmental Science* 2011 4, 1742-1758.
37. Gassner, M.; **Vogel, F.**; Heyen, G.; Maréchal, F. Process design of SNG production by hydrothermal gasification of waste biomass: Thermoeconomic process modelling and integration, *Energy & Environmental Science* 2011 4, 1726-1741.
36. Rabe, S.; Nachtegaal, M.; Ulrich, T.; **Vogel, F.** Towards Understanding Catalytic Reforming of Biomass in Supercritical Water, *Angew. Chem. Int. Ed.* 2010 49, 6434-6437.
35. Peterson, A. A.; Tester, J. W.; **Vogel, F.** Water-in-water tracer studies of supercritical-water reversing jets using neutron radiography, *J. Supercritical Fluids* 2010 54 (2), 250-257.
34. Kopyscinski, J.; Schildhauer, T. J.; **Vogel, F.**; Biollaz, S. M. A.; Wokaun, A. Applying spatially resolved concentration and temperature measurements in a catalytic plate reactor for the kinetic study of CO methanation, *J. Catal.* 2010 271, 262-279.
33. Schubert, M.; Regler, J. W.; **Vogel, F.** Continuous salt precipitation and separation from supercritical water. Part 2: Type 2 salts and mixtures of two salts, *J. Supercritical Fluids* 2010 52 (1), 113-124.
32. Schubert, M.; Regler, J. W.; **Vogel, F.** Continuous salt precipitation and separation from supercritical water. Part 1: Type 1 salts, *J. Supercritical Fluids* 2010 52 (1), 99-112.

31. Haiduc, A. G.; Brandenberger, M.; Suquet, S.; **Vogel, F.**; Bernier-Latmani, R.; Ludwig, C. SunCHem: an integrated process for hydrothermal production of methane from microalgae and CO₂ mitigation. *J. Appl. Phycol.* 2009 21, 529-541.
30. Rabe, S.; **Vogel, F.**; Truong, T.-B.; Shimazu, T.; Wakasugi, T.; Aoki, H.; Sobukawa, H. Catalytic reforming of gasoline to hydrogen: Kinetic investigation of deactivation processes. *Int. J. Hydrogen Energy* 2009 34 (19), 8023-8033.
29. Gaan, S.; Rupper, P.; Salimova, V.; Heuberger, M.; Rabe, S.; **Vogel, F.** Thermal decomposition and burning behavior of cellulose treated with ethyl ester phosphoramidates: Effect of alkyl substituent on nitrogen atom. *Polymer Degradation and Stability* 2009 94, 1122-1134.
28. Rouff, A. A.; Rabe, S.; Nachtegaal, M.; **Vogel, F.** X-ray Absorption Fine Structure Study of the Effect of Protonation on Disorder and Multiple Scattering in Phosphate Solutions and Solids. *J. Phys. Chem. A* 2009, 113 (25), 6895-6903.
27. Stucki, S.; **Vogel, F.**; Ludwig, C.; Haiduc, A. G.; Brandenberger, M. Catalytic gasification of algae in supercritical water for biofuel production and carbon capture. *Energy & Environmental Science* 2009 2 (5), 535-541.
26. Requies, J.; Rabe, S.; **Vogel, F.**; Truong, T.-B.; Filonova, K.; Barrio, V. L.; Cambra, J.; Güemez, B.; Arias, P. L. Reforming of methane over noble metal catalysts: catalyst deactivation induced by thiophene. *Catalysis Today* 2009 143 (1-2), 9-16.
25. Peterson, A. A.; Vontobel, P.; **Vogel, F.**; Tester, J. W. Normal-phase dynamic imaging of supercritical-water salt precipitation using neutron radiography. *J. Supercritical Fluids* 2009 49 (1), 71-78.
24. Luterbacher, J. S.; Fröling, M.; **Vogel, F.**; Maréchal, F.; Tester, J. W. Hydrothermal gasification of waste biomass: Process design and life cycle assessment. *Environ. Sci. Technol.* 2009 43 (5), 1578-1583.
23. Rabe, S.; **Vogel, F.** A thermogravimetric study of the partial oxidation of methanol for hydrogen production over a Cu/ZnO/Al₂O₃ catalyst. *Appl. Catal. B* 2008 84, 827-834.
22. Peterson, A. A.; **Vogel, F.**; Lachance, R. P.; Fröling, M.; Antal, M. J.; Tester, J. W. Thermochemical biofuel production in hydrothermal media: A review of sub- and supercritical water technologies. *Energy & Environmental Science* 2008b 1 (1), 32-65.
21. Peterson, A. A.; Vontobel, P.; **Vogel, F.**; Tester, J. W. In situ visualization of the performance of a supercritical-water salt separator using neutron radiography. *J. Supercritical Fluids* 2008a 43, 490-499.
20. Waldner, M. H.; Krumeich, F.; **Vogel, F.** Synthetic Natural Gas by Hydrothermal Gasification of Biomass. Selection Procedure Towards a Stable Catalyst and its Sodium Sulfate Tolerance. *J. Supercritical Fluids* 2007 43, 91-105.
19. **Vogel, F.**; Waldner, M. H.; Rouff, A. A.; Rabe, S. Synthetic natural gas from biomass by catalytic conversion in supercritical water. *Green Chemistry* 2007 9 (6), 616-619.
18. Barrio, V. L.; Schaub, G.; Rhode, M.; Rabe, S.; **Vogel, F.**; Cambra, J. F.; Arias, P. L.; Güemez, M. B. Reactor modeling to simulate catalytic partial oxidation and steam reforming of methane. Comparison of temperature profiles and strategies for hot spot minimization. *Int. J. Hydrogen Energy* 2007 32, 1421-1428.

17. Rabe, S.; Nachtegaal, M.; **Vogel, F.** Catalytic Partial Oxidation of Methane to Synthesis Gas over a Ruthenium Catalyst: the role of the oxidation state. *Physical Chemistry Chemical Physics* 2007b 9, 1461-1468.
16. Rabe, S.; Truong, T.-B.; **Vogel, F.** Catalytic Autothermal Reforming of Methane: Performance of a kW scale reformer using pure oxygen as oxidant. *Applied Catalysis A: General* 2007a 318, 54-62.
15. Bosco, M.; Hajbolouri, F.; Truong, T.-B.; De Boni, E.; **Vogel, F.**; Scherer, G. G. Link-up of a bench-scale "shift-less" gasoline fuel processor to a polymer electrolyte fuel cell. *Journal of Power Sources* 2006 159 (2), 1034-1041.
14. Bosco, M.; **Vogel, F.** Optically accessible channel reactor for the kinetic investigation of hydrocarbon reforming reactions. *Catalysis Today* 2006 116, 348-353.
13. Ludwig, C.; Scharnhorst, W.; Rabe, S.; **Vogel, F.**; Stucki, S. Energy and Materials from Waste and Biomass Using Hydrothermal Processes. *The Chinese Journal of Process Engineering* 2006 6 (2), 54-59.
12. Rabe, S.; Truong, T.-B.; **Vogel, F.** Low Temperature Catalytic Partial Oxidation of Methane for Gas-To-Liquids Applications. *Applied Catalysis A: General* 2005 292, 177-188.
11. Waldner, M. H.; **Vogel, F.** Renewable Production of Methane from Woody Biomass by Catalytic Hydrothermal Gasification. *Ind. Eng. Chem. Res.* 2005 44 (13), 4543-4551.
10. **Vogel, F.**; DiNaro Blanchard, J. L.; Marrone, P. A.; Rice, S. F.; Webley, P. A.; Peters, W. A.; Smith, K. A.; Tester, J. W. Critical Review of Kinetic Data For the Oxidation of Methanol in Supercritical Water. *J. Supercritical Fluids* 2005 34, 249-286.
9. Van herle, J.; Schuler, A.; Dammann, L.; Bosco, M.; Truong, T.-B.; De Boni, E.; Hajbolouri, F.; **Vogel, F.**; Scherer, G. G. Fuels for Fuel Cells: Requirements and Fuel Processing. *Chimia* 2004 58 (12), 887-895.
8. **Vogel, F.**; Smith, K. A.; Tester, J. W.; Peters, W. A. Engineering Kinetics for Hydrothermal Oxidation of Hazardous Organic Substances. *AIChE Journal* 2002 48 (8), 1827-1839.
7. Geissler, K.; Newson, E.; **Vogel, F.**; Truong, T. B.; Hottinger, P.; Wokaun, A. Autothermal methanol reforming for hydrogen production in fuel cell applications. *Phys. Chem. Chem. Phys.* 2001 3, 289-293.
6. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. The Mean Oxidation Number of Carbon (MOC) – A Useful Concept for Describing Oxidation Processes. *Water Research* 2000 34 (10), 2689-2702.
5. Zhou, N.; Krishnan, A.; **Vogel, F.**; Peters, W. A. A Computational Model for Supercritical Water Oxidation of Organic Toxic Wastes. *Advances in Environmental Research* 2000 4, 79-95.
4. Harf, J.; Hug, A.; **Vogel, F.**; Rudolf von Rohr, P. Scale-Up of Catalytic Wet Oxidation under Moderate Conditions. *Environmental Progress* 1999 18 (1), 14-20.
3. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. Promoted Oxidation of Phenol in Aqueous Solution Using Molecular Oxygen at Mild Conditions. *Environmental Progress* 1999 18 (1), 7-13.

2. Hug, A.; Harf, J.; **Vogel, F.**; Rudolf von Rohr, P. Deactivation of Sewage Sludge by Wet Oxidation (WO) Using the LOPROX Process: A Complete Wastewater Plant/WO System with an Analysis of Wet Oxidation Products. *Chem. Eng. Technol.* 1998 21 (11), 880-885.
1. Hug, A.; Harf, J.; **Vogel, F.**; Rudolf von Rohr, P. Inertisierung von Klärschlamm durch NaBoxidation (NO) nach dem LOPROX-Verfahren: Gesamtsystem ARA/NO mit Stoffflußanalysen der NO, *Chemie-Ingenieur-Technik* 1998 70 (7), 898-902.

BOOKS AND BOOK CONTRIBUTIONS

1. **Vogel, F.** *Nassoxidation von Phenol mit Sauerstoff bei milden Bedingungen*. Fortschritt-Berichte VDI, Reihe 3: Verfahrenstechnik, Nr. 533, VDI Verlag: Düsseldorf, 1998, ISBN 3-18-353303-0.
2. **Vogel, F.** *Hydrothermal Processes*. In: Municipal Solid Waste Management, Ludwig, Ch., Hellweg, S., Stucki, S. (Eds.), Springer: Berlin, 2003, 204-210, ISBN 3-540-44100-X.
3. **Vogel, F.** *Catalytic conversion of high-moisture biomass to synthetic natural gas in supercritical water*. In: Handbook of Green Chemistry, Paul Anastas (Series Editor), Volume 2 Heterogeneous Catalysis, Robert Crabtree (Volume Editor), Wiley-VCH: Weinheim, 2009, chapter 12, 281-324, ISBN 978-3-527-32497-2.
4. Kruse, A.; **Vogel, F.**; van Bennekom, J.; Venderbosch, R. *Biomass gasification in supercritical water*. In: Handbook Biomass Gasification, Second Edition, H.A.M. Knoef (Editor), btg Biomass Technology Group, 2012, chapter 9, 251-280, ISBN 978-90-819385-0-1.

PLENARIES, KEYNOTES, AND INVITED TALKS AT CONFERENCES

1. **Vogel, F.** *Catalysis under hydrothermal conditions*. International Workshop "Future Concepts in Energy Related Catalysis", session on Catalytic Fuel Processing, Monte Verità, Switzerland, March 13-17, 2005 (invited talk).
2. Bosco, M.; Truong, T.-B.; De Boni, E.; **Vogel, F.** *Optically accessible channel reactor for kinetic investigations of gasoline reforming reactions*, 2nd European Hydrogen Energy Conference, Zaragoza, Spain, November 22-25, 2005 (**keynote**).
3. **Vogel, F.**; Nachtegaal, M.; Wambach, J. *Advanced in-situ instrumentation for catalysis research at the Paul Scherrer Institut*. Defining the Future III, Munich, Germany, September 24-26, 2007 (invited talk).
4. Schubert, M.; Regler, J. W.; **Vogel, F.** *Effiziente Salzabscheidung als ein wichtiger Schritt bei der katalytischen, hydrothermalen Vergasung nasser Biomasse*, 10. Tagung Ionenchromatographie, Luzern, Switzerland, May 7, 2008 (invited talk).
5. **Vogel, F.**; Schubert, M.; Brandenberger, M.; Regler, J. W. *Recent advances in catalytic hydrothermal gasification of biomass to synthetic natural gas*. XVII Congresso Nazionale di Chimica Industriale, Società Chimica Italiana, Genova, June 30-July 3, 2008 (**invited keynote**).
6. Brandenberger, M.; Schubert, M.; Müller, J.; **Vogel, F.**; Ludwig, C.; Stucki, S.; Haiduc,

A. G.; Bernier-Latmani, R. *SunChem: a 3rd Generation Biofuel Technology to Produce Methane from Algae*. 36th Discussion Forum LCA of Future Biofuels, EMPA, Dübendorf, Switzerland, November 17, 2008 (invited talk).

7. **Vogel, F.** *PSI's catalytic hydrothermal gasification process*. Bio-SNG '09, Int. conference on advanced biomass-to-SNG technologies and their market implementation, Zürich, Switzerland, May 27, 2009 (invited talk).
8. **Vogel, F.** *SunChem – Recent Results on the Hydrothermal Conversion of Algae to Bio-Methane*. 17th European Biomass Conference & Exhibition, Hamburg, Germany, June 30, 2009 (**plenary**).
9. **Vogel, F.** *Hydrothermale katalytische Vergasung von Biomasse – eine Übersicht*. Fachgespräch “Hydrothermale Verfahren zur Nutzung von nachwachsenden Rohstoffen”, Forschungszentrum Karlsruhe, Germany, organized by Fachagentur Nachwachsende Rohstoffe, September 2, 2009 (invited talk).
10. **Vogel, F.** *Catalytic hydrothermal conversion of biomass to methane*. 1st Chilean International Seminar on Biogenic Gases as Fuels for the Future, Universidad de Concepción, Chile, July 1, 2010 (invited talk).
11. **Vogel, F.;** Kröcher, O. *Hydrothermale Synthese von Biomethan aus nasser Biomasse*. Kolloquium Sustainable BioEconomy, Karlsruhe Institute of Technology (KIT), December 6-7, 2010 (invited talk).
12. **Vogel, F.** *Catalytic conversion of biomass to methane in supercritical water*. RRB7, 7th Int. Conference on Renewable Resources & Biorefineries, Bruges, Belgium, June 8-10, 2011 (invited talk).
13. **Vogel, F.;** Brandenberger, M.; Ludwig, Ch. *SunChem – Hydrothermale Vergasung von Algenbiomasse*, 5. Bundesalgenstammtisch, DECHEMA, München-Pullach, Germany, March 26-27, 2012 (invited talk).

CONFERENCE PROCEEDINGS

1. **Vogel, F.;** Hildebrand, F. *Catalytic Hydrothermal Gasification of Woody Biomass at High Feed Concentrations*. Proceedings 4th International Symposium on High Pressure Process Technology and Chemical Engineering, *Chemical Engineering Transactions*, 2, 771-777, Bertucco, A. (Ed.), AIDIC, 2002, ISBN 88-900775-1-4.
2. **Vogel, F.;** Waldner, M. H.; De Boni, E. *Efficient production of synthetic natural gas from biomass by hydrothermal gasification*. Proceedings Joint 20th AIRAPT – 43rd EHPRG Conference on Science and Technology of High Pressure, Forschungszentrum Karlsruhe, Germany, 2005, ISBN 3-923704-49-6.
3. **Vogel, F.;** Waldner, M. H. *Catalytic hydrothermal gasification of woody biomass at high feed concentrations*. Proceedings “Science in Thermal and Chemical Biomass Conversion STCBC”, A. V. Bridgwater, D. G. B. Boocock (Eds.), Vol. 2, 1001-1012, CPL Press, March 2006, ISBN 1-872691-97-8.

TALKS AND POSTERS AT CONFERENCES

1996

1. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. *Waste water and sewage sludge treatment with wet oxidation*. 12th International Congress of Chemical and Process Engineering CHISA '96, Prague, Czech Republic, August 25-30, 1996, ISBN 80-02-01106-6 69.
2. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. *Wie sinnvoll sind TOC und CSB in der Verfahrenstechnik der Abwasser- und Schlammbehandlung?* Preprints 3. GVC-Kongress „Verfahrenstechnik der Abwasser- und Schlammbehandlung“, Würzburg, Germany, October 14-16, 1996.
3. Harf, J.; Hug, A.; **Vogel, F.**; Rudolf von Rohr, P. *Die katalytische Niederdruck-Nassoxidation von Klärschlämmen*, Preprints 3. GVC-Kongress „Verfahrenstechnik der Abwasser- und Schlammbehandlung“, Würzburg, Germany, October 14-16, 1996, 211-216.
4. Hug, A.; Harf, J.; **Vogel, F.**; Rudolf von Rohr, P. *Die katalytische Niederdruck-Nassoxidation als Vorbehandlungsprozess zur Abwasserreinigung*, Preprints 3. GVC-Kongress „Verfahrenstechnik der Abwasser- und Schlammbehandlung“, Würzburg, Germany, October 14-16, 1996, 487-491.
5. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. *Neue Erkenntnisse in der katalytischen Niederdruck-Nassoxidation von Phenol-Abwässern*, Preprints 3. GVC-Kongress „Verfahrenstechnik der Abwasser- und Schlammbehandlung“, Würzburg, Germany, October 14-16, 1996.
6. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. *Oxidative Degradation of Phenol Using Molecular Oxygen*. 3rd International Conference on Advanced Oxidation Technologies for Water and Air Remediation AOTs-3, Cincinnati, Ohio/USA, October 26-29, 1996.

1997

7. Harf, J.; Hug, A.; **Vogel, F.**; Rudolf von Rohr, P. *Simultaneous Wet Oxidation of Waste Water and Sewage Sludge*, ECCE-1, Proceedings of The first European Congress on Chemical Engineering, Florence, Italy, May 4-7, 1997, 517-520.
8. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. *The Mean Oxidation Number of Carbon (MOC) as a Helpful Tool for Describing Oxidation Processes*. 4th International Conference on Advanced Oxidation Technologies for Water and Air Remediation AOTs-4, Orlando, Florida/USA, September 23-26, 1997.
9. **Vogel, F.**; Harf, J.; Hug, A.; Rudolf von Rohr, P. *Catalytic Low Pressure Wet Oxidation of Sewage Sludge*. 4th International Conference on Advanced Oxidation Technologies for Water and Air Remediation AOTs-4, Orlando, Florida/USA, September 23-26, 1997.
10. Rudolf von Rohr, P.; Harf, J.; Hug, A.; **Vogel, F.** *Scale-Up of Catalytic Wet-Oxidation under Moderate Conditions*. AIChE Annual Meeting 1997, Los Angeles, USA, session “Environmental Reaction Engineering I”, paper 262i, November 16-21, 1997.
11. **Vogel, F.**; Rudolf von Rohr, P.; Harf, J.; Hug, A. *Promoted Oxidation of Phenol in*

Aqueous Solution Using Molecular Oxygen at Mild Conditions. AIChE Annual Meeting 1997, Los Angeles, USA, session "Environmental Reaction Engineering I", paper 262h, November 16-21, 1997.

1998

12. Zhou, N.; Krishnan, A.; **Vogel, F.** *A Computational Model for Supercritical Water Oxidation of Organic Toxic Wastes.* AIChE Annual Meeting 1998, Miami Beach, Florida/USA, paper 1471, November 15-20, 1998.

2000

13. **Vogel, F.**; DiNaro, J. L.; Marrone, P. A.; Rice, S. F.; Peters, W. A.; Tester, J. W. *Critical Review of Kinetic Data for the Oxidation of Methanol in Supercritical Water.* AIChE Annual Meeting 2000, Los Angeles, USA, session "SCF for Pollution Prevention", paper 40h, November 12-17, 2000.
14. **Vogel, F.**; Smith, K. A.; Tester, J. W.; Peters, W. A. *Distributed Activation Energy Kinetics Model for Supercritical Water Oxidation of Complex Organic Wastes.* AIChE Annual Meeting 2000, Los Angeles, USA, session "Thermodynamics and Processing With Supercritical Fluids", paper 116f, November 12-17, 2000.
15. Newson, E.; **Vogel, F.**; Truong, T. B.; Geissler, K.; Schildhauer, T. *Catalysis, Reaction Engineering and Systems Analysis to produce Hydrogen from Liquid Energy Carriers by Partial Oxidation.* Energy Technologies for a Sustainable Future, Villigen PSI, Switzerland, poster session, November 23-24, 2000.

2001

16. **Vogel, F.**; Smith, K. A.; Tester, J. W.; Peters, W. A. *Distributed Activation Energy Kinetics Model for Supercritical Water Oxidation of Complex Organic Wastes.* Exploratory Workshop on Supercritical Fluids as Active Media: Fundamentals and Applications, European Science Foundation, Valladolid, Spain, September 20-23, 2001, 135-145.

2002

17. **Vogel, F.**; Hildebrand, F. *Catalytic Hydrothermal Gasification of Woody Biomass at High Feed Concentrations.* 4th International Symposium on High Pressure Process Technology and Chemical Engineering, EFCE 628th event, Venice, Italy, September 22-25, 2002.

2003

18. **Vogel, F.** *Catalytic Hydrothermal Gasification of Woody Biomass at High Feed Concentrations.* Seminar "Überkritische Fluide – Messmethoden für Stoffdaten und Prozesse mit überkritischen Fluiden", Institut für Nichtklassische Chemie, Leipzig, Germany, February 3, 2003.
19. **Vogel, F.** *Autothermal Reforming of Gasoline to Hydrogen for Automotive Applications.* Swiss Fuel Cell Research Symposium, Yverdon-Les-Bains, Switzerland, May 20, 2003.
20. Stucki, S.; Biollaz, S.; **Vogel, F.** *Vom Holz zum Methan.* FVS Fachtagung "Regenerative Kraftstoffe", Zentrum für Sonnenenergie- und Wasserstoff-Forschung,

Stuttgart, Germany, November 13/14, 2003, 210-217.

2004

21. **Vogel, F.** *Green Energy from Wet Biomass by Catalytic Gasification in Supercritical Water*. CERC3 Young Chemists' Workshop "Neoteric Solvents as Reaction Media: Reality and Future", St Malo, France, April 17-21, 2004.
22. Waldner, M. H.; **Vogel, F.** *Catalytic Hydrothermal Gasification of Woody Biomass*. 2nd World Conference and Technology Exhibition on Biomass for Energy, Industry and Climate Protection, Rome, Italy, May 10-14, 2004.
23. Bosco, M.; Truong, T.-B.; De Boni, E.; **Vogel, F.** "Shift-less" fuel processing unit to produce hydrogen from gasoline for fuel cell systems. 15th World Hydrogen Energy Conference, Session 5-4. Hydrogen from Fossil Fuels, Yokohama, Japan, June 27-July 2, 2004 (2nd prize poster award).
24. Bosco, M.; Truong, T.-B.; **Vogel, F.** *New reactor concept for kinetic investigations of autothermal gasoline reforming*. 15th World Hydrogen Energy Conference, Session 5-4. Hydrogen from Fossil Fuels, Yokohama, Japan, June 27-July 2, 2004.
25. Rabe, S.; Truong, T.-B.; Bosco, M.; **Vogel, F.** *Low Temperature Catalytic Partial Oxidation of Hydrocarbons on Ru- and Rh-based Catalysts*. 13th International Congress on Catalysis, poster session, Paris, France, July 11-16, 2004.
26. **Vogel, F.**; Waldner, M. H. *Catalytic Hydrothermal Gasification of Woody Biomass and Manure at High Feed Concentrations*. International Conference "Science in Thermal and Chemical Biomass Conversion STCBC", Victoria, Canada, August 30-September 3, 2004.
27. **Vogel, F.**; Waldner, M. H. *Hydrothermale Vergasung von nasser Biomasse zu Methan*. 13. Symposium Energie aus Biomasse – Biogas, Flüssigkraftstoffe, Festbrennstoffe, poster session, Kloster Banz, Bad Staffelstein, Germany, November 25/26, 2004.

2005

28. Barrio, V. L.; Schaub, G.; Rabe, S.; **Vogel, F.**; Cambra, J. F.; Arias, P. L.; Güemez, M. B.; Rohde, M. *Fixed bed reactor modeling for syngas production via natural gas wet catalytic partial oxidation*. International Workshop "Future Concepts in Energy Related Catalysis", poster session, Monte Verità, Switzerland, March 13-17, 2005.
29. Peterson, A.; Waldner, M.; **Vogel, F.**; Tester, J.; Fröling, M. *Fuels from Biomass: Use of Neutron Radiography to Improve the Design of a Salt Separator in Supercritical Water Biomass Conversion*. AGS Annual Meeting, poster session, Massachusetts Institute of Technology, Cambridge/MA, USA, March 20-23, 2005.
30. Peterson, A.; Waldner, M.; **Vogel, F.**; Tester, J. *Methane and Nutrient Salts from Waste Biomass: Development of a Catalytic Conversion Process in Supercritical Water*. Energy Technologies for a Sustainable Future ETSF 5, Energy and Large Research Facilities, poster session, Villigen PSI, Switzerland, June 9-10, 2005.
31. Rabe, S.; Truong, T.-B.; **Vogel, F.** *Catalytic Partial Oxidation (CPO) of Methane to Synthesis Gas over Noble Metal Catalysts*. 4th International Conference on

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59. Schubert, M.; Müller, J.; **Vogel, F.** *Influence of K_3PO_4 on the catalytic hydrothermal gasification of glycerol.* 17th European Biomass Conference & Exhibition, poster session, Hamburg, Germany, June 29-July 3, 2009 (**best poster award**).
60. Rouff, A. A.; Rabe, S.; Nachtegaal, M.; **Vogel, F.** *Investigating the effect of protonation on disorder and multiple scattering in phosphate solutions and solids using XAFS.* 238th American Chemical Society National Meeting, poster session, Washington DC, USA, August 16-20, 2009.
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73. Kröcher, O.; **Vogel, F.**; Biollaz, S. *Löst BioSNG die Vergärung ab?* Tagung BiomassEnergie „Algen ins Netz!“, Kartause Ittingen, Switzerland, November 24-25, 2010.

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poster session, Berlin, Germany, June 6-10, 2011.

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77. Wambach, J.; Schubert, M.; Dreher, M.; **Vogel, F.** *In situ and deactivation studies of the gasification of biomass in super-critical water over Ru/C catalysts.* XV. International Symposium on Relations between Homogeneous and Heterogeneous Catalysis (XV-ISHHC); Fritz-Haber Institut, Berlin, Germany, poster session, September 11-16, 2011.
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 81. Reimer, J.; Pin, S.; **Vogel, F.** *Biomass-related Salt Solutions at Hydrothermal Conditions - Investigation with High Pressure Differential Scanning Calorimetry.* Summer School of Calorimetry, CNRS, Lyon, France, poster session, June 10-15, 2012.
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 86. Pin, S.; Huthwelker, T.; Reimer, J.; Wambach, J.M.; **Vogel, F.** *New high temperature - high pressure XAS cell to study salt precipitation at and near supercritical conditions of water.* 3rd Workshop on the simultaneous combination of spectroscopies with x-ray

absorption, scattering and diffraction techniques, ETH Zürich, Switzerland, poster session, July 4-6, 2012.

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2. Patentanmeldung EP10165557.9 (2010-06-10) "A process and a plant for hydrothermal SNG production from waste biomass", Paul Scherrer Institut, Erfinder: Gassner, M., **Vogel, F.**, Maréchal, F., 2010.
3. Patentanmeldung WO 2007/038996 A1 (2007-04-12) "Verfahren zur Erzeugung von Methan und/oder Methanhydrat aus Biomasse" (Process for generating methane and/or methane hydrate from biomass), Paul Scherrer Institut, Erfinder: **Vogel, F.**; Waldner, M.; Truong, T.-B.; De Boni, E.; Stucki, S., 2005.
4. Patentanmeldung PCT/CH97/00142 (1997-04-21) "Verfahren zur Herstellung eines Reaktionsbeschleunigers für die Oxidation organischer Stoffe in der flüssigen Phase" (Process for the preparation of a reaction accelerator for the oxidation of organic substances in the liquid phase), ETH Zurich, Erfinder: **Vogel, F.**, Harf, J., Hug, A., Rudolf von Rohr, P., 1997.

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1. Sendung *Einstein*, Schweizer Radio und Fernsehen SRF, 23.6.2011
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2. **Vogel, F.**; DiNaro, J. L. *The "Final Word" On Methanol Oxidation - Factors influencing the reproducibility of chemical kinetics measurements in SCWO*. MIT, 10.978 seminar, Cambridge, MA, USA, December 14, 1998.
3. **Vogel, F.** *Modeling of SCWO Using a Simple Autoxidation Mechanism – Application to Methanol and Benzene*. MIT, 10.978 seminar, Cambridge, MA, USA, April 13, 1999.
4. **Vogel, F.** *Oxidationen in flüssiger und überkritischer Phase – Neue Verfahren zur Entsorgung von flüssigen und festen Abfällen*. Bayer AG, Leverkusen, Germany, April 30, 1999, (invited talk).
5. **Vogel, F.** *Oxidationen in unter- und überkritischem Wasser - Neuer Wein in alten (und neuen) Schläuchen*. Paul Scherrer Institut, Villigen, Switzerland, October 11, 1999, (invited talk).
6. **Vogel, F.** *Contribution to Innovation with Catalysts and Membranes*, In: *Energie-Spiegel*, Schmid, R. (Ed.), Paul Scherrer Institut, no. 8, January 2003.
7. **Vogel, F.** *Simulation chemischer Prozesse mit Aspen plus®*. General Energy Departmental seminar, PSI, October 23, 2003.
8. **Vogel, F.**; Scherer, G. G. *Nachhaltige Verfahren der Wasserstofferzeugung und -nutzung*. SATW-Bulletin, Nr. 4, 2003, 21-28 (invited article).
9. **Vogel, F.**; Guggisberg, B. *Methan aus nasser Biomasse*. ENET-News, Nr. 56, November 2003, 15 (invited article).
10. **Vogel, F.**; Waldner, M. H. *Methan aus nasser Biomasse. Hydrothermale Vergasung forst- und landwirtschaftlicher Biomassen*. *Gas Wasser Abwasser gwa*, 5/2004, 327-335 (invited article).
11. Ludwig, Ch.; **Vogel, F.** *Von nasser Biomasse zum Treibstoff*. BASF Future Business GmbH, Ludwigshafen, Germany, June 16, 2004 (invited talk).
12. **Vogel, F.** *Von nasser Biomasse zum Brennstoff – Katalytische Vergasung holzartiger Biomasse zu Methan in überkritischem Wasser*. Seminar at the Engler-Bunte-Institut, Universität Karlsruhe, Germany, June 28, 2004 (invited talk).
13. **Vogel, F.**; Waldner, M. H. *Catalytic Hydrothermal Gasification of Woody Biomass*

and Manure at High Feed Concentrations. Seminars at the National Renewable Energy Laboratory, Golden/CO, and Pacific Northwest National Laboratory, Richland/WA, USA, August 25 & 27, 2004.

14. Stucki, S.; **Vogel, F.**; Biollaz, S. *Thermische Umwandlung von Biomasse zu Methan*. Erneuerbare Energien, Ausgabe 10, Oktober 2004, 59-61.
15. **Vogel, F.** *Hydrothermal Processes for the Production of Energy, Fuels and Chemicals – An emerging technology for thermal waste treatment*. Seminar on Thermal Waste Treatment, Environmental Science and Technology Institute, EPFL, Lausanne, January 17, 2006 (invited talk).
16. **Vogel, F.** *Catalytic Conversion of Biomass to Methane in Supercritical Water*. Tester group seminar talk, Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, USA, April 27, 2006 (invited talk).
17. **Vogel, F.** *Technological Options for Biofuels Production*. Interdisciplinary seminar on Environment and Agriculture, Graduate Institute of International Studies, University of Geneva, May 17, 2006 (invited talk).
18. **Vogel, F.** *Hydrothermal Processes for the Production of Energy, Fuels and Chemicals – An emerging technology for advanced waste treatment*. Seminar on Advanced Solid Waste Treatment, Environmental Science and Technology Institute, EPFL, Lausanne, February 7, 2007 (invited talk).
19. Schell, J.; **Vogel, F.**; Dietrich, P.; Boulouchos, K.; Soltic, P.; Pfender, C. *H₂-enriched fuel on demand for future hybrid powertrains HEFD-HY*. General Assembly of the Competence Center Energy and Mobility CCEM-CH, poster session, Paul Scherrer Institut, Villigen, Switzerland, June 12, 2007.
20. **Vogel, F.** *Hydrothermal Processes for the Production of Energy, Fuels and Chemicals – An emerging technology for advanced waste treatment*. Seminar on Advanced Solid Waste Treatment, Environmental Science and Technology Institute, EPFL, Lausanne, December 19, 2007 (invited talk).
21. **Vogel, F.** *Catalytic Process Engineering at PSI*. Process and Energy Department, TU Delft, The Netherlands, February 13, 2008 (invited talk).
22. **Vogel, F.** *Technologien und Perspektiven der Energiegewinnung aus Biomasse – Hydrothermale Vergasung von nasser Biomasse*. ETH Alumni - Process Alumni event, Zürich, April 3, 2008 (invited talk).
23. Brandenberger, M.; Schubert, M.; Regler, J. W.; Haiduc, A.; Ludwig, C.; **Vogel, F.** *SunChem – Bio-Synthetic Natural Gas from Microalgae*. Poster presentation, EPFL Research Day, Lausanne, April 18, 2008.
24. **Vogel, F.** *Katalytische Aspekte der hydrothermalen Vergasung nasser Biomasse zu Methan*. Kolloquium am Institut für Technische Chemie, Forschungszentrum Karlsruhe, Germany, July 8, 2008 (invited talk).
25. *Wasserstoff und Methan: Bindeglieder in der Energieversorgung von morgen*. Public talk at *Tage der offenen Tür*, Paul Scherrer Institut, Villigen, Switzerland, October 25,

2008.

26. **Vogel, F.** *Hydrothermale Vergasung von nasser Biomasse zu synthetischem Erdgas.* Wintershall Holding AG, Kassel, Germany, November 18, 2008 (invited talk).
27. **Vogel, F.** *Neue Technologien zur Erzeugung biogener Gase – Methan aus Holz und Hydrothermale Vergasung nasser Biomasse.* 4. Frühjahrstreffen der Betreiber von Biogasanlagen, Kleindöttingen, Switzerland, March 20, 2009 (invited talk).
28. **Vogel, F.** *Katalytische hydrothermale Vergasung nasser Biomasse.* Biomasse Co-Verbrennung in der Gasturbine, CCEM Informationsveranstaltung, Paul Scherrer Institut, Villigen, Switzerland, June 16, 2009.
29. *Forschen überm kritischen Punkt.* PSI-Jahresbericht 2008, 28-29, ISSN 1423-7261, June 2009.
30. **Vogel, F.;** Ludwig, C.; Wokaun, A. *SunCHem: Make CH₄ from CO₂, sunlight and water!* SULZER-ETH Ideas Lab for the Future on Alternative Energy Technologies, ETH Zürich, November 4, 2009 (invited talk).
31. **Vogel, F.** *Catalytic Fuel Processing: from fossil fuels to biomass.* Symposium on Bioenergy and Catalysis, Paul Scherrer Institut, Villigen, Switzerland, November 23, 2009 (invited talk).
32. **Vogel, F.;** Wambach, J. *Catalytic conversion of biomass to methane in supercritical water.* CAMD/CINF/CASE Seminar, Danish Technical University, DTU Physics, Lyngby, Denmark, February 2, 2010.
33. **Vogel, F.** *Conversion of biomass to methane in hot compressed water.* Seminar an der Universiteit Gent, Belgien, Faculty of Bioscience Engineering, Department of Biosystems Engineering, October 11, 2010 (invited).
34. **Vogel, F.** *SunCHem – hydrothermal conversion of algae to biomethane.* Workshop on algae – Technology Status and Prospects for Deployment, 19th European Biomass Conference and Exhibition, Berlin, Germany, June 8, 2011.
35. **Vogel, F.** *Conversion of biomass to methane in hot compressed water,* Helmholtz Research School for Energy-Related Catalysis, 1st Summer School, Bad Herrenalb, Germany, July 21, 2011 (invited).
36. **Vogel, F.** *Hydrothermal methanation of wet biomass,* NGP2 Seminar 2011, Verfahrenstechnik nachwachsender Rohstoffe, RWTH Aachen, Germany, September 13, 2011 (invited).
37. **Vogel, F.** *Hydrothermale Methanierung nasser Biomasse,* Energie-Agentur der Wirtschaft, Energie-Modell Gruppe Zürichsee, Wädenswil, October 27, 2011 (invited).
38. Ludwig, C.; **Vogel, F.;** Holliger, C.; Schwitzguébel, J.-P.; Maréchal, F.; Gnansounou, E.; Zah, R.; Burkhardt, M. *SunCHem – Ein Verfahren zur Herstellung von Biomethan aus Algen,* Swisselectric Research Award, poster presentation, Zürich, September 18, 2012.

39. **Vogel, F.**; Heusser, P.; Lemann, M.; Kröcher, O. Mit Hochdruck Biomasse zu Methan umsetzen, *Aqua & Gas* 2013 **4**, 30-35.
40. **Vogel, F.** *Saubere Treibstoffe aus Biomasse, Wasser, Druck und Hitze – was fehlt noch?* inaugural lecture, Fachhochschule Nordwestschweiz, Brugg-Windisch, March 6, 2013.
41. **Vogel, F.** *Neue Biomasse-Technologien für die Energiewende*, öffentlicher Vortrag zur Energiestrategie 2050, PSI, Switzerland, August 14, 2013.
42. Bährle, Ch.; **Vogel, F.** *Lignin: structure, reactivity and molecular products*, Biorefinery & Nanocellulose, INNOBITE 1st Workshop, EMPA, Dübendorf, Switzerland, September 16, 2013 (invited talk).
43. **Vogel, F.** *Biomassenutzung und Ressourceneffizienz: Saubere Treibstoffe aus Biomasse*, Aargauische Naturforschende Gesellschaft, Naturama Aarau, October 30, 2013 (invited talk).

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