

H2FC Publications 2019-2020

N Shah

1. Acha Izquierdo S, Le Brun N, Damaskou M, Fubara TC, Mulgundmath V, Markides C, Shah Nclose, 2020, Fuel cells as combined heat and power systems in commercial buildings: A case study in the food-retail sector, *Energy*, Vol: 206, Pages: 1-13, ISSN: 0360-5442 (shared)
2. Bahzad H, Katayama K, Boot-Handford ME, Mac Dowell N, Shah N, Fennell PSclose, 2019, Iron-based chemical-looping technology for decarbonising iron and steel production, *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*, Vol: 91, ISSN: 1750-5836 (shared)
3. Cumicheo C, Mac Dowell N, Shah N, 2019, Natural gas and BECCS: A comparative analysis of alternative configurations for negative emissions power generation, *International Journal of Greenhouse Gas Control*, Vol: 90, Pages: 1-11, ISSN: 1750-5836 (shared)
4. Bahzad H, Shah N, Dowell NM, Boot-Handford M, Soltani SM, Ho M, Fennell PSet al., 2019, Development and techno-economic analyses of a novel hydrogen production process via chemical looping, *International Journal of Hydrogen Energy*, Vol: 44, Pages: 21251-21263, ISSN: 0360-3199 (shared)

V Molkov (all shared)

1. Book. Proceedings of the 9th international seminar on fire and explosion hazards, Volumes 1 (744 pages) and 2 (718 pages), Edited by Snegirev A., Tamanini F., Bradley D., Liu N., Molkov V., Chaumeix N., 21-26 April 2019, Saint Petersburg, Russia.
2. "Blast wave and fireball after hydrogen tank rupture in a fire", Molkov VV, Cirrone DMC, Shentsov VV, Dery W, Kim W, Makarov DV, In: *Applications of Fast Combustion Modes and Detonations in Industry*, pp. 239-253, Torus Press, Russia.
3. "The progress in hydrogen safety research", Molkov V, In: *Proceedings of the 8th International Symposium on Nonequilibrium Processes, Plasma, Combustion and Atmospheric Phenomena (NEPCAP 2018)*, 1-5 October 2018, Adler, Russia.
4. "Scientific Principles of e-Laboratory of Hydrogen Safety", Shentsov V, Makarov D, Molkov V, In: *Proceedings of the 9th international seminar on fire and explosion hazards*, Vol. 2, pp.1306-1314. ISBN: 978-5-7422-6498-9. DOI:10.18720/spbpu/2/k19-82. 2019.
5. "Near Field Thermal Dose of Cryogenic Hydrogen Jet Fires", Cirrone D, Makarov D, Molkov V, In: *Proceedings of the 9th international seminar on fire and explosion hazards*, Vol. 2, pp. 1361-1367. ISBN: 978-5-7422-6498-9, DOI:10.18720/spbpu/2/k19-117. 2019.
6. "Modelling of Hydrogen Tank Fuelling", Dadashzadeh M, Makarov D, Molkov V, In: *Proceedings of the 9th international seminar on fire and explosion hazards*, Vol. 2, pp. 1396-1407. ISBN: 978-5-7422-6498-9, DOI: 10.18720/spbpu/2/k19-20. 2019.
7. "Safety Considerations of an Unignited Hydrogen Release from Onboard Storage in a Naturally Ventilated Covered Car Park", Hussein HG, Brennan S, Makarov D, Shentsov V, Molkov V, In: *Proceedings of the 9th international seminar on fire and explosion hazards*, Vol. 2, pp. 1408-1422. ISBN: 978-5-7422-6498-9, DOI: 10.18720/spbpu/2/k19-27. 2019.
8. "Contribution of combustion to the blast wave strength after high-pressure hydrogen tank rupture in a fire", Molkov VV, Cirrone DMC, Shentsov VV, Dery W, Makarov DV, In: *Proceedings of ICDERS 2019*, 28 July – 2 August 2019, Paper 18, Beijing, China.
9. "Cryogenic hydrogen jets: flammable envelope size and hazard distances for jet fire", Cirrone D, Makarov D, Molkov V, In: *Proceedings of the 8th International Conference on Hydrogen Safety*, Adelaide, Australia, 24-26 September 2019. Paper ID: 191.
10. "Non-adiabatic under-expanded jet theory for blowdown and fire resistance rating of hydrogen tank", Dadashzadeh M, Makarov D, Kashkarov S, Molkov V, In: *Proceedings of the 8th International Conference on Hydrogen Safety*, Adelaide, Australia, 24-26 September 2019. Paper ID: 182.

11. "European hydrogen safety panel (EHSP)", Azkarate I, Carcassi MN, Dolci F, Garcia-Hombrados A, Grüne J, Hawksworth S, Jordan T, Mair G, Melideo D, Molkov V, Moretto P, Reinecke EA, Sathiah P, Schmidtchen U, Skjold T, Studer E, Van Esbroeck T, Vyazmina E, Wen J Xiao J, In: Proceedings of the 8th International Conference on Hydrogen Safety, Adelaide, Australia, 24-26 September 2019. Paper ID: 205.
12. "Towards fire test protocol for hydrogen storage tanks", Kashkarov S, Molkov V, In: Proceedings of the 8th International Conference on Hydrogen Safety, Adelaide, Australia, 24-26 September 2019. Paper ID: 188.
13. "Blast wave from a hydrogen tank rupture in a fire in the open: Hazard distance nomograms", Kashkarov S, Li Z, Molkov V, International Journal of Hydrogen Energy, Vol. 45, 2020, pp. 2429-2446. <https://doi.org/10.1016/j.ijhydene.2019.11.084>
14. "Effect of shock structure on stabilization and blow-off of hydrogen jet flames", Takeno K, Yamamoto S, Sakatsume R, Hirakawa S, Shentsov V, Makarov D, Molkov V, International Journal of Hydrogen Energy, Vol. 45, 2020, pp. 10145-10154. <https://doi.org/10.1016/j.ijhydene.2020.01.217>
15. "Simulation of blast wave and fireball after hydrogen tank rupture in a fire in the open atmosphere", Molkov VV, Cirrone DMC, Shentsov VV, Dery W, Kim W, Makarov DV, International Journal of Hydrogen Energy, submitted June 2020.
16. "The blast wave decay correlation for hydrogen tank rupture in a tunnel fire", Molkov V, Dery W, International Journal of Hydrogen Energy, submitted July 2020.

I Metcalfe

1. K. Kousi, D. Neagu, L. Bekris, E. Cali, G. Kerherve, E. I. Papaioannou, D. J. Payne and I. S. Metcalfe, J. 'Low temperature methane activation via subsurface exsolved Co particles' *J Mater. Chem. A* 2020, 8, 12406.
2. K. Kousi, D. Neagu, I. S. Metcalfe 'Combining exsolution and infiltration for redox, low temperature CH₄ conversion to syngas', *Catalysts* 2020, 10(5), 468.
3. K. Kousi, D. Neagu, L. Bekris, E. I. Papaioannou and I. S. Metcalfe 'Endogenous nanoparticles strain perovskite host lattice providing oxygen capacity and driving oxygen exchange and CH₄ conversion to syngas', *Angew.Chem.Int.Ed.* 2020, 59, 2510–2519.
4. V. Kyriakou, D. Neagu, G. Zafeiropoulos, R. K. Sharma, C. Tang, K. Kousi, I. S. Metcalfe, M. C. M. van de Sanden & M. N. Tsampas 'Symmetrical Exsolution of Rh Nanoparticles in Solid Oxide Cells for Efficient Syngas Production from Greenhouse Gases', *ACS Catal.* 2020, 10, 2, 1278-1288.
5. Dragos Neagu, Evangelos I. Papaioannou, Bernhard Tjaden, Xuekun Lu, Cheuk-Man Mak, Michael W. Gaultois, Brian Ray, Paul Shearing, Ian S. Metcalfe, "Tracking the evolution of a single composite particle during redox cycling for application in H₂ production" *Sci. Rep.*, 10, 5266 (2020).
6. D. Neagu, V. Kyriakou, L. Roiban, M. Aouine, C. Tang, A. Caravaca, K. Kousi, I. Schreur-Piet, I. S. Metcalfe, P. Vernoux, M. C.M. van de Sanden & M. N. Tsampas 'In situ observation of nanoparticle exsolution from perovskite oxides - from mechanistic insight to new nanostructures', *ACS Nano* 2019, 13, 11, 12996-13005

N Brandon (all publications shared)

1. Gayon-Lombardo A, Lukas M, Brandon N, Cooper S, 2020, [Pores for thought: Generative adversarial networks for stochastic reconstruction of 3D multi-phase electrode microstructures with periodic boundaries](#), *npj Computational Materials*, Vol: 6, Pages: 1-11
2. Li T, Lu X, Rabuni MF, Wang B, Farandos NM, Kelsall GH, Brett DJL, Shearing PR, Ouyang M, Brandon NP, Li K, 2020, [High-performance fuel cell designed for coking-resistance and efficient conversion of waste methane to electrical energy](#), *ENERGY & ENVIRONMENTAL SCIENCE*, Vol: 13, Pages: 1879-1887
3. Jais AA, Ali SAM, Anwar M, Somalu MR, Muchtar A, Isahak WNRW, Baharudin NA, Lim KL, Brandon NP, 2020, [Performance of Ni/10Sc1CeSZ anode synthesized by glycine nitrate process assisted by microwave heating in a solid oxide fuel cell fueled with hydrogen or methane](#), *JOURNAL OF SOLID STATE ELECTROCHEMISTRY*, Vol: 24, Pages: 711-722
4. Chen J, Wang X, Boldrin P, Brandon NP, Atkinson A, 2019, [Hierarchical dual-porosity nanoscale nickel cermet electrode with high performance and stability](#), *Nanoscale*, Vol: 11, Pages: 17746-17758

T Mays

1. "Chemical modification of the polymer of intrinsic microporosity PIM-1 for enhanced hydrogen storage", Tian, M, Rochat, S, Fawcett, H, Burrows, AD, Bowen, CR, Mays, TJ, Adsorption. DOI: 10.1007/s10450-020-00239-y. *Only H2FC funding*.
2. "Flexible ZIFs: Probing guest-induced flexibility with CO₂, N₂ and Ar adsorption", Noguera-Díaz, A, Villarroel-Rocha, J, Ting, VP, Bimbo, N, Karim Sapag, K, Mays, TJ, *Journal of Chemical Technology and Biotechnology*, Vol. 94, 2019, pp. 3787-3792. DOI 10.1002/jctb.5947. *Shared funding*.
3. "A reference high-pressure methane adsorption isotherm for Zeolite-Y: Results of an interlaboratory study", Mays, TJ, Tian, M and 45 other UK and international co-authors, *Adsorption* (Accepted, August 2020). *Shared funding*.
4. "Solvent sorption induced actuation of polymer-based composites", Polak-Kraśna, K, Tian, M, Rochat, S, Gathercole, N, Yuan, G, Hao, Z, Pan, M, Mays, TJ, Bowen, CR, *ACS Applied Polymer Materials* (In review, submitted June 2020). *Shared funding*.

A Kucernak

1. Castanheira, L.; Bedouet, M.; Kucernak, A.; Hinds, G., Influence of microporous layer on corrosion of metallic bipolar plates in fuel cells. *Journal of Power Sources* **2019**, *418*, 147-151.
2. Lopes, T.; Beruski, O.; Manthanwar, A. M.; Korkischko, I.; Pugliesi, R.; Stanojev, M. A.; Andrade, M. L. G.; Pistikopoulos, E. N.; Perez, J.; Fonseca, F. C.; Meneghini, J. R.; Kucernak, A. R., Spatially resolved oxygen reaction, water, and temperature distribution: Experimental results as a function of flow field and implications for polymer electrolyte fuel cell operation. *Applied Energy* **2019**, *252*, 113421.
3. Jackson, C.; Raymakers, L.; Mulder, M.; Kucernak, A., Poison Mitigation Strategies for the Use of Impure Hydrogen in Electrochemical Hydrogen Pumps and Fuel Cells. *Journal of Power Sources* **2020**, *472*, 1-13.
4. Jackson, C.; Raymakers, L. F. J. M.; Mulder, M. J. J.; Kucernak, A. R. J., Assessing electrocatalyst hydrogen activity and CO tolerance: Comparison of performance obtained using the high mass transport 'floating electrode' technique and in electrochemical hydrogen pumps. *Applied Catalysis B: Environmental* **2020**, *268*, 118734.

5. Zalis, C. M.; Kucernak, A. R. J.; Lin, X.; Sharman, J. D. B., Electrochemical Measurement of Intrinsic Oxygen Reduction Reaction Activity at High Current Densities as a Function of Particle Size for Pt_{4-x}Cox /C (x=0,1,3) Catalysts. *ACS Catalysis* **2020**, *10* (7), 4361–4376.
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7. Zhang, G.; Kucernak, A. R. J., The gas accessible membrane electrode (GAME): a versatile platform for elucidating electrocatalytic processes using real time and in situ hyphenated electrochemical techniques. *ACS Catalysis* **2020**, *10*, 9684-9693.
8. Bramble Energy is featured in “Fuel cell Industry Review 2019”, in section “Remote, portable and military options”, p 40.

R Steinberger-Wilckens

1. O.Omoregbe, A.N.Mustapha, R.Steinberger-Wilckens, A.El-Kharouf, A.Hart, H.Onyeaka: Carbon Capture Technologies for Climate Change Mitigation: A Bibliometric Analysis of the Scientific Discourse During 1998-2018. Accepted in Energy Reports May 2020, paper EGYR_2020_124_R1.
2. Bhargav Pandya, Ahmad El-Kharouf, Robert Steinberger-Wilckens: Transient Analysis of the solid oxide fuel cell coupled absorption refrigeration system for refrigerated transportation. Proceedings of the 14th European SOFC & SOE Forum, 20-23/10/2020, Lucerne, paper A0918.
3. Mohammed Kazeem Ayodeji, Robert Steinberger-Wilckens: Integrating SOEs with a methanation reactor for methane gas production using an MCFC for CO₂ capture from biogas. Proceedings of the 14th European SOFC & SOE Forum, 20-23/10/2020, Lucerne; paper A1221.
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8. M.Taylor, A.El-Kharouf, R.Steinberger-Wilckens: SOFC technology for heavy-duty vehicle propulsion. Proceedings of the 14th European SOFC & SOE Forum, 20-23/10/2020, Lucerne; paper A1301.
9. O.Omoregbe, A.El-kharouf, R.Steinberger-Wilckens: The impacts of collaborations in the development of Solid oxide Fuel Cell technologies during 2000-2019: A bibliometric analysis. Proceedings of the 14th European SOFC & SOE Forum, 20-23/10/2020, Lucerne; paper A0808.
10. N.A.Arifin, L.Troskialina, H.Shamsuddin, R.Steinberger-Wilckens: Effects of Sn doping on the manufacturing, performance and carbon deposition of Ni/ScSZ cells in solid oxide fuel cells. *IJHE* (2020) in print, available online 02/08/2020; doi 10.1016/j.ijhydene.2020.07.071.

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13. A.J.Majewski, P.R.Slater, R.Steinberger-Wilckens: Understanding the effect of water transport on the thermal expansion properties of the perovskites $\text{BaFe}_{0.6}\text{Co}_{0.3}\text{Nb}_{0.1}\text{O}_{3-\delta}$ and $\text{BaCo}_{0.7}\text{Yb}_{0.2}\text{Bi}_{0.1}\text{O}_{3-\delta}$. In print *J. Material Science*, June 2020.
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15. V.Venkataraman, A.El-Kharouf, B.Pandya, E.Amakiri, R.Steinberger-Wilckens: Coupling of engine exhaust and fuel cell exhaust with vapour absorption refrigeration/air conditioning systems for transport applications: A Review. Accepted for *Thermal Science and Engineering Progress*, Apr 2020; manuscript TSEP-D-20-00147R1.
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D Book

1. "Compositional effects on the hydrogen cycling stability of multicomponent Ti-Mn based alloys". S. Nayebossadri, D. Book. *International Journal of Hydrogen Energy*, 2019. 44, 10722-10731.
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J Irvine

1. "Microwave irradiation synthesis to obtain La_{0.7-x}Pr_xCa_{0.3}MnO₃ perovskites". AC. Ferrel-Alvarez, MA. Dominguez-Crespo, H. Cong, AM. Torres-Huerta, D. Palma-Ramirez, JTS. Irvine. *J. Alloy. Compd.* 2020. 851, 0925-8388
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P Dodds

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