

Advanced Solid Cycle with Efficient Novel Technologies



ASCENT project

List of the produced works

1. I. Martínez, D. Armaroli, M. Gazzani, and M. C. Romano, Integration of the Ca–Cu Process in Ammonia Production Plants. *Industrial and Engineering Chemistry research; Ind. Eng. Chem. Res.*, 2017, 56 (9), pp 2526–2539
2. M. Martini, I. Martinez, F. Gallucci, M. C Romano, P. Chiesa, M. van Sint Annaland. Packed Bed Ca-Cu Looping Process Integrated with a Natural Gas Combined Cycle for low Emission Power Production. *Energy procedia 2017*
3. A. L. García-Lario, M. Aznar, I. Martinez, G. S. Grasa, R. Murillo. Experimental study of the application of a NiO/NiAl₂O₄ catalyst and a CaO-based synthetic sorbent on the Sorption Enhanced Reforming process. *International Journal of Hydrogen Energy Vol. 40, 1, 5 January 2015, pp 219–232*
4. A. L. García-Lario, G. S. Grasa and R. Murillo. Performance of a combined CaO-based sorbent and catalyst on H₂ production, via sorption enhanced methane steam reforming. *Chemical Engineering Journal Volume 264, 15 March 2015, Pages 697–705*
5. A. L. García-Lario, M. Aznar, G. S. Grasa, R. Murillo. Evaluation of process variables on the performance of Sorption Enhanced Methane Reforming. *Journal of Power Sources Volume 285, 1 July 2015, pp 90–99*
6. J.R. Fernández, J. M. Alarcón, J. C. Abanades. Investigation of a fixed-bed reactor for the calcination of CaCO₃ by the simultaneous reduction of CuO with a fuel gas, International Conference on Chemical and Biochemical Engineering 20-22 2015 July Paris, France
7. J.M. Alarcón, J.R. Fernández, J.C. Abanades. Investigation of the calcination of CaCO₃ by the simultaneous reduction of CuO with a fuel gas in a fixed-bed reactor. 6th High Temperature Solid Looping Cycles Network Meeting 1st - 2nd September 2015, Milan, Italy
8. M. Martini, F. Gallucci, I. Martínez, M.C. Romano, P. Chiesa, M. van Sint Annaland: Process integration of Packed Bed Ca-Cu Process for High Efficiency and Near-Zero Emission Hydrogen Generation. 6th IEAGHG High Temperature Solid Looping Cycles Network Meeting, 1-2/09/2015, Milan.
9. M.V. Navarro, G.S. Grasa, R. Murillo, Catalysts for sorption enhanced reforming with oxidation/reduction cycles, 6th High Temperature Solid Looping Cycles Network Meeting, 1st - 2nd September 2015, Milan, Italy (oral presentation)
10. L. Díez, G.S. Grasa, R. Murillo, Study of CuO-based materials for Ca/Cu reforming process, 6th High Temperature Solid Looping Cycles Network Meeting, 1st - 2nd September 2015, Milan, Italy (oral presentation)
11. M. Martini, A. van den Berg, F. Gallucci, M. van Sint Annaland. Investigating of the process operability windows for Ca-Cu looping for pure hydrogen production with CO₂ capture. Poster presented at 10th European Congress of Chemical Engineering (ECCE10), Nice, October 2015.

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12. J.M Alarcón, J.R. Fernández. CaCO₃ calcination by the simultaneous reduction of CuO in a Ca/Cu chemical looping process. *Chemical Engineering Science Volume 137, 1 December 2015, Pages 254–267*
13. J. R. Fernández, J. M. Alarcón, J. C. Abanades. Investigation of a fixed-bed reactor for the calcination of CaCO₃ by the simultaneous reduction of CuO with a fuel gas. *Ind. Eng. Chem. Res., 2016, 55 (18), pp 5128–5132*
14. J. R. Fernandez, I. Martinez, J.C. Abanades, M.C. Romano. Conceptual design of a Ca/Cu chemical looping process for hydrogen production in integrated steelworks. *International Journal of Hydrogen and Energy. (2017) 1-15*
15. M.V. Navarro, J.M. López, R. Murillo, G.S. Grasa, A. Scullard and G. Williams, Study of reforming catalyst with Ca-sorbents for sorption enhanced reforming coupled to Ca/Cu chemical loop. 21st World Hydrogen Energy Conference 2016, Zaragoza, Spain 13-16th June, 2016.
16. J.R. Fernández, J.M. Alarcón and J.C. Abanades, Optimized design and operation strategy of a Ca-Cu chemical looping process for hydrogen production, 21st World Hydrogen Energy Conference 2016. Zaragoza, Spain. 13-16th June, 2016
17. M. Martini, I. Martinez, F. Gallucci, M. C. Romano, M. Van Sint Annaland. Increasing the Carbon Capture Efficiency of the Ca/Cu looping process with advanced process schemes. *4th International Conference on Chemical Looping, September 26-28, 2016, Nanjing, China*
18. M. Martini, A. van den Berg, F. Gallucci, M. van Sint Annaland, Investigation of the process operability windows for Ca-Cu looping for hydrogen production with CO₂ capture, *Chem. Eng. J.* 303 (2016) 73–88. available online: <http://dx.doi.org/10.1016/j.cej.2016.05.135>
19. M. Martini, I. Martinez, F. Gallucci, M. C Romano, P. Chiesa, M. van Sint Annaland. Packed Bed Ca-Cu Looping Process Integrated with a Natural Gas Combined Cycle for low Emission Power Production. *13th International Conference on Greenhouse Gas Control Technologies GHGT13 14-18 November 2016, Lausanne Switzerland*
20. S. S. Kazi, A. Aranda, L. di Felice, J. Meyer, R. Murillo, G. Grasa, Development of Cost Effective and High Performance Composite for CO₂ Capture in CaCu Looping Process. 13th International Conference on Greenhouse Gas Control Technologies, GHGT-13, November 2016, Lausanne, Switzerland.
21. J.M. López, M.V. Navarro, R. Murillo, G.S. Grasa, Development of synthetic Ca-based CO₂ sorbents for sorption enhanced reforming coupled to Ca/Cu chemical loop. 13th International Conference on Greenhouse Gas Control Technologies, GHGT-13, November 2016, Lausanne, Switzerland.
22. J.R. Fernández, I. Martínez, J.C. Abanades, Sorption enhanced production of hydrogen in industrial processes using two chemical loops, 9th Trondheim Conference on CO₂ Capture, Transport and Storage, (TCCS-9), 12-14th June, 2017, Trondheim, Norway
23. J.R. Fernández, J.C. Abanades. Optimized design and operation strategy of a Ca-Cu chemical looping process for hydrogen production. *Chem Eng Sci Vol 166, pp 144-160 2017*
24. M. Martini, F. Gallucci, M. van Sint Annaland - Experimental and modelling study of CO₂ sorbent for Ca-Cu chemical looping process WHEC 2016
25. Matthew E. Boot-Handford, Paul Fennell. K-Impregnated Hydrotalcites as sorbents for pre-combustion CO₂ capture application. Poster presented at UKCCSRC meeting 11th-12th April 2017
26. I. Aloisi, N. Jand, F. Micheli, P. U. Foscolo, Sorption Enhanced Reforming to produce H₂ Modeling bifunctional catalyst/sorbent particles. 21st International Congress of Chemical and Process Engineering CHISA 2014 Prague

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27. J. Meyer, J. Mastin, C. Sanz Pinilla. Sustainable Hydrogen Production from Biogas Using Sorption Enhanced Reforming Energy Procedia 63 (2014) 6800 – 6814.
28. S. S. Kazi, A. Aranda, J. Meyer, J. Mastin. High performance CaO-based sorbents for pre- and post- combustion CO₂ capture at high temperature. Energy procedia Vol. 63 (2014), 2207-2215
29. F. Micheli, C. Courson, K. Gallucci, P. U. Foscolo, Combined Sorbent-Catalyst Material for Sorption Enhanced Steam Methane Reforming. European SET Plan Conference 2014, Rome
30. G. N. Kalantzopoulos, S. S. Kazi, G. Grasa, J. Mastin, R. Murillo, J. Meyer. Development of high performance CO₂ solid sorbents combined with a reforming catalyst for hydrogen production by Sorption-Enhanced Reforming (SER), In Antonio Mendez-Vilas (ed.), *Materials and Technologies for Energy Efficiency. The Energy & Materials Research Conference (EMR2015), Madrid, February 2015.*
31. S.S. Kazi, J. Mastin, J. Meyer, C. Sanz Pinilla. Development of Agglomerated CO₂ Sorbent with Enhanced Chemical and Mechanical Stability for Hydrogen Production. *8th Trondheim Conference on CO₂ Capture, Transport and Storage 16 June 2015*
32. I. Aloisi, A. Di Carlo, N. Jand, P.U. Foscolo. SE-SMR - Catalyst / Sorbent Particle and Fluidized Bed Reactor Models: a Preliminary Approach. 2 Settembre 2015 - IEA-GHGT 6, Milan, Italy
33. G. S. Grasa M. Aznar T. Lozano, R. Murillo J. Meyer, M. A. Aranda, G. Kalantzopoulos. Evaluation of mayenite supported Ni-catalysts suitable for SER processes. IEA-GHGT 6, Milan, Italy
34. J. Meyer, S.S. Kazi, J. Mastin, C. Sanz Pinilla. Development of Agglomerated CO₂ Sorbent with Enhanced Chemical and Mechanical Stability for Hydrogen Production. *6th High Temperature Solid Looping Cycles Network Meeting 1st - 2nd September 2015, Milan, Italy*
35. L. Rossi, K. Gallucci, A. Di Nicola, A. Romano, I. Aloisi, A. Di Giuliano, L. Arrizza, M. Giammatteo, G. Taglieri, G. Vanga, R. Viscardi, S. Scaccia, R. Mancini, S. Stendardo, “Synthesis, characterisation and testing of combined sorbent-catalytic material (CSCM) for CO₂ capture using coal fly ash or cement as support” *6th High Temperature Solid Looping Cycle network meeting*
36. P. U. Foscolo, I. Aloisi, A. Di Giuliano, K. Gallucci, C. Courson, R. Massacesi, J. Girr, “Bi-functional solid particles for Sorption Enhanced Steam Methane Reforming: modelling and experimental data” *XXII International Conference on Chemical Reactors CHEMREACTOR-22, London (UK)*
37. I. Aloisi, A. Di Carlo, N. Jand, P.U. Foscolo, “Coupling catalyst/sorbent particle and fluidized bed reactor models to simulate sorption enhanced steam methane reforming. Preliminary simulations”. *European Symposium on Chemical Reaction Engineering- ESCRE 2015Veranstaltungsforum Fürstenfeld, Fürstenfeldbruck, Germany*
38. A. Di Giuliano, C. Courson, P. U. Foscolo, K. Gallucci, A. Romano, A. Kiennemann, “CaO-Ni-mayenite Combined Sorbent-Catalyst Materials for Sorption Enhanced Methane Steam Reforming”. *Colloque de recherche 2016 Chimie et Procédés du Végétal, Fédération Gay-Lussac, Montpellier, France*
39. A. Di Giuliano, C. Courson, P. U. Foscolo, “Catalytic methane steam reforming enhanced by CO₂ sorption”, *French Conference on Catalysis, FCCat from 23rd to 27th May 2016 at "Centre Azureva" Frejus (FRANCE)*
40. A. Aranda, M. Aznar, J. Meyer, S. Kazi, R. Murillo, G. Grasa, L. Di Felice. Performance of optimized CO₂ solid sorbents for hydrogen production by Sorption-Enhanced Reforming (SER) in fluidised bed reactor. World Hydrogen Energy Conference, 13-16 June 2016, Zaragoza, Spain

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41. A. Di Giuliano, J. Girr, C. Courson, K. Gallucci, A. Kiennemann, “Ni-CaO Combined Sorbent-Catalyst Materials usage for Sorption Enhanced Steam Methane Reforming”, *WHEC2016, Zaragoza (SPAIN)*
42. A. Di Giuliano, I. Aloisi, N. Jand, P.U. Foscolo, C. Courson, K. Gallucci, “Sorption enhanced steam methane reforming: experimental data and simulations describing the behaviour of bi-functional particles”, *WHEC2016, Zaragoza (SPAIN)*
43. I. Aloisi, N. Jand, S. Stendardo and P. U. Foscolo. Hydrogen by sorption enhanced methane reforming: a grain model to study the behavior of bi-functional sorbent-catalyst particles. *Chemical Engineering Science Volume 149, 31 July 2016, Pages 22–34.*
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45. A. Di Carlo, I. Aloisi, N. Jand, S. Stendardo, P. U. Foscolo, “Sorption Enhanced Steam Methane reforming on catalyst/sorbent bifunctional particles: a CFD fluidized bed reactor model”, *XXII International Conference on Chemical Reactors CHEMREACTOR-22, London (UK)*
46. I. Aloisi, T. Antonini, A. Di Carlo, A. Di Giuliano, U. Pasqual Laverdura, K. Gallucci, Energie "pulite" o comunque "meno sporche"...”, *European reseachers' night 2016 – UNIVAQ Street Science, L'Aquila (ITALY)*
47. I. Aloisi, A. Di Giuliano, A. Di Carlo, P. U. Foscolo, C. Courson, K. Gallucci, Sorption enhanced catalytic steam methane reforming: experimental data and simulations describing the behaviour of bi-functional particles”, *Chemical Engineering Journal, vol 314, 2017 pp 570-582*
48. A. Di Giuliano, J. Girr, R. Massacesi, K. Gallucci, C. Courson, “Sorption enhanced steam methane reforming by Ni-CaO materials supported on mayenite”, *International Journal of Hydrogen Energy, In Press 2017*
49. S. Stendardo. Interview at the Radio24 - <http://www.radio24.ilsole24ore.com/> - 16 September 2014
50. M. Romano. Integration of high temperature CO₂ sorbents systems in power and industrial plants for carbon capture and storage (CCS): opportunities and challenges. The University of Sydney 5th May 2016
51. Newsletter 26th September 2016 - Launching of the EU-Australian workshop
52. Newsletter 04th May 2016 - project summary with EU added values
53. M. Boot-Handford, P. Fennell. ASCENT: Next Generation Pre-Combustion CO₂ Capture Technologies for the Production of Hydrogen from Natural Gas and Syngas. UNSW Chemical Engineering Seminar Series 10th November 2016
54. S. Stendardo. European Energy innovation - 2016 Winter Edition - 13 December 2016
55. Newsletter 15th March 2017 - Activities towards the production of material for proof of concept test
56. Newsletter 3rd March 2017 - Modelling in ASCENT and its experimental validation
57. Newsletter 5th April 2017 - H₂ production at proof-of-concept scale in a fast HP fluid bed reactor
58. Newsletter 21st April 2017 - Interim LCA report on the ASCENT technologies