Dr. Martin Roeb

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Born: 08. June 1967

Education

1986	Abitur, Gymnasium am Wirteltor in Düren
1987-1993	Studies: Chemistry, University of Köln
1993	Diploma in Chemistry
1993-1997	Doctoral Thesis, University of Köln
1997	Examination (Physical Chemistry)

Professional Career

1993-1997	Research Assistant (University of Köln, Physical Chemistry)
1998-1999	Researcher at DLR Stuttgart, Institute of Technical Physics, Laser Research
since 1999	Researcher at DLR Köln, Solar Research
since 2001	Project Coordinator of national and international Research Projects
since 2008	Project group leader
since 2011	Team leader Solar Chemical Engineering
since 2012	Responsible for interdisciplinary center CeraStorE
since 2015	Sub-Topic speaker of the HGF area of „Solar Fuels – Systems“

Awards

1997	Doctroal Thesis awarded with distinction
2005	Eco Tech Award 2005, Expo Tokyo, für das EU-Projekt HYDROSOL
2006	Technical Achievement Award of the International Partnership for the Hydrogen Economy (IPHE) for the EU-Projekt HYDROSOL
2006	**Descartes Research Prize 2006** of EU for EU-Projekt HYDROSOL
2007	Best Paper Award ASME Conference Energy Sustainability, Hydrogen Production, Long Beach, CA, USA
2009	Member of German Delegation for 12th German-American Frontiers of Engineering Symposium organised by Humboldt-Society
2009	1. Price of DLR Competition of Visions 2009/2010
2010	Poster Award of Dechema-VDI-GVC ProcessNet-Fachsektion Reaktionstechnik zum Jahrestreffen Reaktionstechnik, Karlsruhe
2013	Best Poster Award EUROMAT, Sevilla
2014	WHEC AWARD 2014 for Exceptional Oral Presentation, Gwangju, Korea

Scientific Interests and Fields

Solar Generation and Upgrading of Fuels – in particular Hydrogen and Syngas – using High temperature processes like

- Thermochemical Cycles
- High Temperature Electrolysis
- Steam and Dry reforming of hydrocarbons
- Cracking of Hydrocarbons

Solar Treatment of residues and wastes
Solar recycling
Solar Smelting
Solar Production of mass and fine chemicals like fertilizers
Solar Reduction von Metal Oxides
Solar Processing of ores

Committees, Networks and Expert Groups

Since 2007: representing DLR in the VHTR high temperature hydrogen network Germany

Since 2008: representing DLR in Implementing Agreements of International Energy Association (IEA), e.g Task 25: High Temperature Processes for Hydrogen Production

Since 2010: BMBF-Messenger “Future of Energy”

Since 2010: representing DLR in the High Temperature Hydrogen Production Group of the International Association for Hydrogen Energy (IAHE)

Since 2012: European Representative in the Programme Management Board of GEN-4 Hydrogen Production Program

Since 2015: Sub-Topic Speaker HGF-Topic Solar Fuels – Systems

Since 2004: Reviewer for several scientific journals and National and International Research Programs

Since 2014: Associated Editor of the Journal Energy Technology and Policy

Publications in peer-reviewed scientific Journals (some highlights)

B. Bulfin, J. Vieten, D. E. Starr, A. Azarpira, C. Zachäus, M. Hävecker, K. Skorupska, M. Schmücker, M. Roeb, and C. Sattler, Redox chemistry of $CaMnO_3$ and $Ca_{0.8}Sr_{0.2}MnO_3$ oxygen storage perovskites. Journal of Materials Chemistry A, 2017. DOI: 10.1039/C7TA00822H

J.-P. Säck , S. Breuer, P. Cotelli, A. Houaijia, M. Lange, M. Wullenkord, C. Spenke, M. Roeb, Chr. Sattler, High temperature hydrogen production: Design of a 750 KW demonstration plant for a two step thermochemical cycle, Solar Energy 135 (2016) 232–241.

von Storch, H., Roeb, M., Stadler, H., Sattler, C., Hoffschmidt, B., Efficiency potential of indirectly heated solar reforming with different types of solar air receivers, Applied Thermal Engineering, 92 (2016), 202-209.

Martin Roeb, Aldo Steinfeld, Günter Borchardt, Claus Feldmann, Martin Schmücker, Christian Sattler and Robert Pitz-Paal, SolarSyngas: Results from a virtual institute developing materials and key components for solar thermochemical fuel production, AIP Conf. Proc. 1734 (2016), 120007.

Brendan Bulfin, Matthias Lange, Lamark de Oliveira, Martin Roeb, Christian Sattler, Solar thermochemical hydrogen production using ceria zirconia solid solutions: Efficiency analysis, International Journal of Hydrogen Energy 41 (2016) 19320–19328 .

N. Bayer Botero, D. Thomey, A. Guerra Niehoff, M. Roeb, C. Sattler, R. Pitz-Paal, Modelling and scaling analysis of a solar reactor for sulphuric acid cracking in a hybrid sulphur cycle process for thermochemical hydrogen production, International Journal of Hydrogen Energy, 41 (2016) 8008-8019.

A. Guerra Niehoff, N: Bayer-Botero, A: Acharya, D: Thomey, M: Roeb, C: Sattler, R: Pitz-

Spiridon O. Alexopoulos, Jürgen Dersch, Martin Roeb, Robert Pitz-Paal, Simulation model for the transient process behaviour of solar aluminium recycling in a rotary kiln, Applied Thermal Engineering 78 (2015) 387-396.

J.-P. Säck, M. Roeb, C. Sattler, R. Pitz-Paal, A. Heinzel, Development of a simulation-software for a hydrogen production process on a solar tower, Solar Energy 112 (2015) 205–217.

M. Lange, M. Roeb, C. Sattler, R. Pitz-Paal, Efficiency assessment of a two-step thermochemical water-splitting process based on a dynamic process model, International Journal of Hydrogen Energy 40 (2015) 12108-12119.

C. Agrafiotis, M. Roeb, C. Sattler, A Review on Solar Syngas Production via Redox Pair-based Water/Carbon Dioxide Splitting Thermochemical Cycles, Renewable and Sustainable Energy Reviews, 42, (2015) 254-285.

A. Houaijia, S. Breuer, D. Thomey, C. Brosig, J.P. Säck, M. Roeb, C. Sattler, Solar hydrogen by high-temperature electrolysis: Flowsheeting and experimental analysis of a tube-type receiver concept for superheated steam production. Energy Procedia 49 (2014) 1960-1969.

Martin Roeb, Christian Sattler, Isothermal Water Splitting, Science 341 (2013) 470-471.

M. Roeb, M. Neises, N. Monnerie, F. Call, H. Simon, C. Sattler, M. Schmücker, R. Pitz-Paal, Materials-Related Aspects of Thermochemical Water and Carbon Dioxide Splitting: A Review. Materials 5 (2012) 2015-2054.

M. Roeb, M. Neises, N. Monnerie, C. Sattler, R. Pitz-Paal, Technologies and Trends in Solar Power and Fuels, Energy Environ. Science 4 (2011), 2503 – 2511.

Martin Roeb and Hans Müller-Steinhagen, Concentrating on Solar Electricity and Fuels, Science 329 (2010) 773-774.

Invited Talks

M. Roeb, C. Glasmacher-Remberg, J. Dersch, R. Schäfer, K.-H. Funken, Solar Thermal Recycling of Aluminium, Int. Secondary Aluminium Congress, Cannes, France, March 6-7, 2001.

M. Roeb, C. Sattler, Use of Sustainable Energy in Mining and Mineral Engineering, First NESMI Congress, 3-4 November 2003, Prague, Czech Republic.

M. Roeb, N. Monnerie, L. de Oliveira, N. Rohner, Nicola, C. Willsch, R. Schäfer, C. Sattler, A New Approach for Solar Thermo-Chemical Water Splitting, Proceedings of the International German Hydrogen Energy Congress 2004, Feb. 11-12, Essen, Germany.

M. Roeb, C. Sattler, Water - A Raw Material for Sustainable Generation of Hydrogen as a Fuel, 15th Int. Conference on the Properties of Water and Steam, Sep. 7-11, 2008, Berlin, Germany.

M. Roeb, D. Graf, HycycleS - Projekt im FP7 der Europäischen Union, Erfolgreich forschen in Europa - Netzwerkveranstaltung Energie, Mülheim a.d. Ruhr, 7. August 2008.

Martin Roeb, High Temperature Processes for Solar Materials Conversion, 12th German-American Frontiers of Engineering Symposium, April 23-25 2009, Potsdam, Germany.

Martin Roeb und Daniela Graf, HycycleS - An European-International Project on CO2-Free Hydrogen Production, Europäische Netzwerkveranstaltung im Rahmen der Veranstaltungsreihe „Erfolgreich forschen in Europa“, 4. März 2010, Düsseldorf.

M. Roeb, J.-P. Säck, P. Rietbrock, C. Prahl, H. Schreiber, M. Neises, L. de Oliveira, D. Graf, M. Ebert, W. Reinalter, M. Meyer-Grünefeld, C. Sattler, A. Lopez, A. Vidal, A. Elsberg, P. Stobbe, D. Jones, A. Steele, S. Lorentzou, C. Pagkoura, A. Zygogianni, C. Agrafiotis, A.G. Konstandopoulos, Solar Thermochemical Hydrogen Production from Water on a Solar Tower, 239th ACS National Meeting 2010, Symposium on Hydrogen from renewable sources and refinery applications March 21-25, 2010, San Francisco, CA, USA.

M. Roeb, D. Thomey, L. de Oliveira, T. Gumpinger, M. Schmücker, C. Sattler, G. Karagiannakis, C. Agrafiotis, A. Konstandopoulos, Stability of catalyst materials and porous absorbers for decomposition of sulphuric acid in a solar reactor, 1st International Conference on Materials for Energy (EnMat 2010), Karlsruhe, Germany, July 4-8, 2010.

Martin Roeb und Christian Sattler, Solar Synthesis Gas by reforming and thermochemical cycles, Solarzeitalter 2011, 12. Mai 2011, Lichtenwalde, Germany.

Martin Roeb, Sulfur and ferrite-based thermochemical cycles for water splitting, SFERA WinterSchool 2011, Zurich, March 24th 2011

M. Roeb, C. Sattler, Solar fuel generation and processing with concentrating solar plants, Invited Speech at Mediterranean Renewable Energy Conference (REM), Ravenna, Italy, Feb. 29 – Mar. 1, 2012.

M. Roeb, Solar High Temperature Processes for Power Production and Materials Conversion, International Summer School "On the Cutting Edge of Sustainable Energy Supply", TUBAF Freiberg, June 14th 2012

Martin Roeb and Christian Sattler (2013), Fuels of the Future from Solar Resources, Oct 21-22 2013, International CAE Conference, Pacengo del Garda, Italy.

Martin Roeb and Christian Sattler, Thermochemical Reactions for Solar Energy Storage and Fuel Production, Concentrating Solar Energy Systems, Eurotherm Seminar No. 98, July 4-5 2013, Vienna, Austria.

Martin Roeb, R&D summary of high temperature steam electrolysis and other projects, Generation IV International Forum Very High Temperature Reactor System Hydrogen Production Project Management Board, 12th Official Meeting, September 23-24, 2013, Beijing, China

Martin Roeb, State-of the-Art and Trends of Solar Fuel Generating Processes, International Kick-off Symposium for Energy Materials Chemistry, 23 June 2014, Kumamoto University, Kumamoto, Japan.

Martin Roeb, Fuel production by solar concentrating technologies, 2nd Int. Symp. On Energy Challenges and Mechanics (ECM 2), Aberdeen, UK, August 20-22 2014.

Martin Roeb, Nathalie Monnerie, Dennis Thomey, Lamark de Oliveira, Jan Säck, Alejandro Guerra Niehoff, Christian Sattler, Towards a Demonstration of a Solar Powered Hybrid Sulfur Cycle, International CAE conference, Pacengo del Garda (Verona), Italy, October 27-28 2014.

C. Agrafiotis, M. Roeb, C. Sattler, “Integrated thermochemical reactors/heat exchangers for solar energy storage based on porous ceramic structures”, 5th International Congress on Ceramics (ICC5), Session “Ceramics for Energy Conversion and Storage”, Beijing, China, August 17th-21st, 2014.