Commentary
Volume 7:1, 2022

Advances in Recycling & Waste Management

ISSN: 2475-7675

Open Access

Progressive Fossil Energy Consumption

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Commentary

This special issue of Fuel is a selection of papers presented at the symposium 'Advanced Fossil Energy Utilization' co-sponsored by the Fuels and Petrochemicals Division and Research and New Technology Committee in the 2009 American Institute of Chemical Engineers (AIChE) Spring National Meeting Tampa, FL, on April 26-30, 2009. This symposium focused on hydrogen production and separation, carbon dioxide capture, and removal of mercury and other contaminants from coal-derived gas. Eight sessions were organized with four pertaining to the subject of fuel processing for hydrogen production, two on carbon dioxide capture and separation, and two on emissions and control of mercury and other trace elements in coal. A total of 54 papers were presented along with two plenary lectures. This symposium provided a platform for investigators in the area of fossil energy research to interact, exchange ideas, discuss current developments, and develop collaborations. A total of nineteen papers from the conference presentations are published in this special issue "Advanced Fossil Energy Utilization" of Fuel. They are grouped into three sections:

(A) Fuel processing for hydrogen production/separation for fuel cell applications

(B) Carbon capture and separation for power generation systems, and

(C) Mercury and other trace elements in fuel: Emissions and control.

We hope that you will find the papers in this special issue informative and thought-provoking.

Fuel cells are not commercial yet, but are rapidly approaching commercial viability and have become a technology of great worldwide interest. Fuel cells are widely seen as cleaner and more efficient energy sources for transport, stationary, and distributed power. Private industry, academia, and government agencies are actively engaged in developing efficient and cost effective fuel cell technology. The fuel processor is a critical component of this system and must be able to provide a clean, tailored synthesis gas to the fuel cell stack for long-term operation. Depending on the application (stationary, central power, remote, auxiliary, transportation, military, etc.), there are a wide range of conventional fuels, such as natural gas (methane), propane, butane, light distillates, methanol, ethanol, propanol, dimethyl ether, naphtha, gasoline, diesel, biodiesel, naval distillate fuel (NATO F-76), kerosene, and jet fuels that could be used in reforming processes to produce H_2-rich synthesis gas. Research papers included in the fuel processing for hydrogen production area discuss catalyst development, kinetics, non-thermal plasma reforming, membrane reactor for hydrogen production and separation, chemical looping reforming, desulfurization for fuel cleanup, and sorbent-enhanced WGS reaction. The capture/separation step for carbon dioxide (CO_2) from large-point sources is a critical one with respect to the technical feasibility and cost of the overall carbon sequestration scenario (capture followed by storage). For power generation point sources, the capture/separation techniques can range from capture/separation of CO_2 from flue gas (post-combustion) to capture from fuel or synthesis gas (pre-combustion). New or improved methods of CO_2 capture that can significantly reduce CO_2 capture costs and associated energy requirements from existing or advanced power systems were discussed primarily in the areas of wet scrubbing and chemical absorption/adsorption with solid sorbents. The results of systems analyses quantifying cost and technical improvements were also a part of the forum. Electricity production is most often associated with burning of fossil fuels with air that ultimately leads to the production of a flue gas. Advanced power generation systems, especially gasification based power generators such as Integrated Gasification Combined Cycle (IGCC), produce a fuel or syngas that can later be burned in a gas turbine combustor [1-5].

In either case the combustion or gasification can produce various pollutants that must be removed due to future regulations or good practices. The United States Environmental Protection Agency is scheduled to issue a national regulation for the emission of mercury from coal-burning power plants by November 2011 and many states are promulgating their own regulations for mercury emissions by coal-fired utilities. Gasification is also an important strategy for increasing the utilization of abundant world coal reserves in a clean and environmentally-friendly manner. High temperature capture of the trace elements mercury, arsenic, and selenium helps preserve the high thermal efficiency of IGCC plants versus low temperature capture by activated carbons. With many states in the US promulgating regulations for mercury control, the need exists for inexpensive mercury removal techniques that can be applied to both IGCC and coal-burning power plants. The symposium sessions devoted to this topic covered the control of the trace elements mercury, arsenic, and selenium in coal-derived gas streams, the fate of arsenic and selenium in flue and fuel gas, and the on-line detection of mercury. The authors thank all participants and presenters who contributed to the success of the symposium. We wish to express our appreciation to the keynote speakers; David A. Atwood (University of Kentucky), Alexander Fridman (Drexel University), Leonard Levin (EPRI), Sharon Sjostrom (ADA-ES) for their contribution. Special thanks to Daniel J. Haynes (Parsons, Inc. Morgantown, WV) and Mark W. Smith (REM Engineering, Morgantown, WV) for their support during this symposium. We also want to express our heartfelt gratitude to all reviewers who provided their thoughtful and timely comments.

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Received 04 January, 2022, Manuscript No. arwm-22-54831; **Editor assigned:** 05 January, 2022, PreQC No. P-54831; **Reviewed:** 10 January, 2022, QC No. Q-54831; **Revised:** 15 January, 2022, Manuscript No. R-54831; **Published:** 21 January, 2022, DOI: 10.37421/arwm.2022.7.209

References

1. Saint-Dizier, Marie, Jennifer Schoen, Shuai Chen, and Charles Banliat, et al. "Composing the early embryonic microenvironment: physiology and regulation of oviductal secretions." *International journal of molecular sciences* 21 (2019): 223.

2. Banliat, Charles, Daniel Tomas, Ana-Paula Teixeira-Gomes, and Svetlana Uzbekova, et al. "Stage-dependent changes in oviductal phospholipid profiles throughout the estrous cycle in cattle." *Theriogenology* 135 (2019): 65-72.

3. Georgiou, A. Stephen, Ambrosius PL Snijders, Edita Sostaric, and Reza Aflatoonian, et al. "Modulation of the oviductal environment by gametes." *Journal of proteome research* 6 (2007): 4656-4666.

4. Yu, Hans, Lena Hackenbroch, Florian RL Meyer, and Judith Reiser, et al. "Identification of rabbit oviductal fluid proteins involved in pre-fertilization processes by quantitative proteomics." *Proteomics* 19 (2019): 1800319.

5. Almiñana, Carmen, Emilie Corbin, Guillaume Tsikis, and Agostinho S. Alcântara-Neto, et al. "Oviduct extracellular vesicles protein content and their role during oviduct–embryo cross-talk." *Reproduction* 154 (2017): 253-268.

How to cite this article: Bellaby, Paul. "Progressive Fossil Energy Consumption." Adv Recycling Waste Manag 7 (2022): 209.