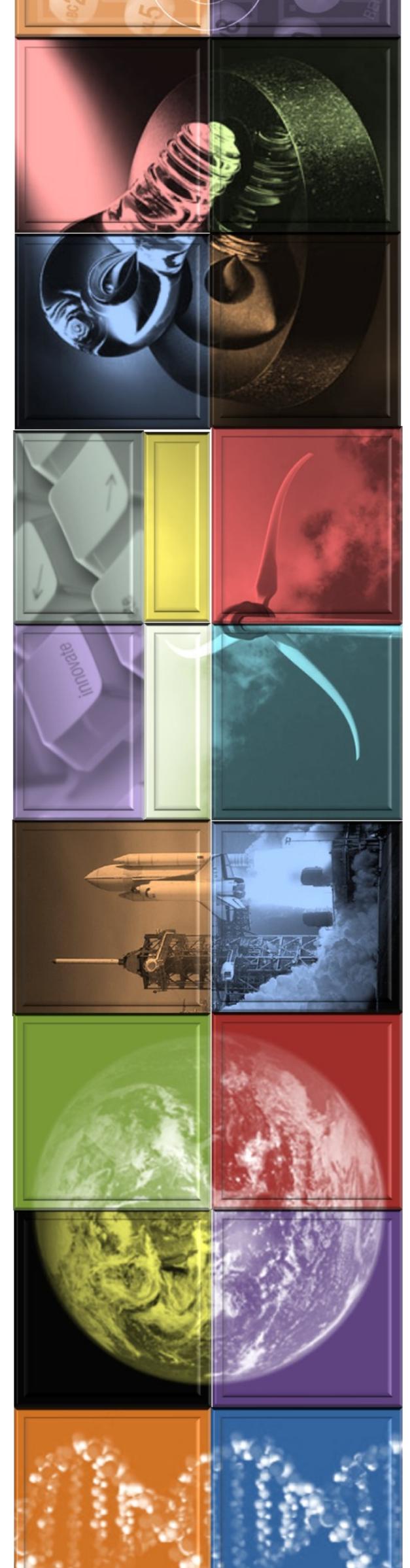


Tomasz Wiltowski Novel Concept For Hydrogen And CO2 Separation From Syngas

The Technology

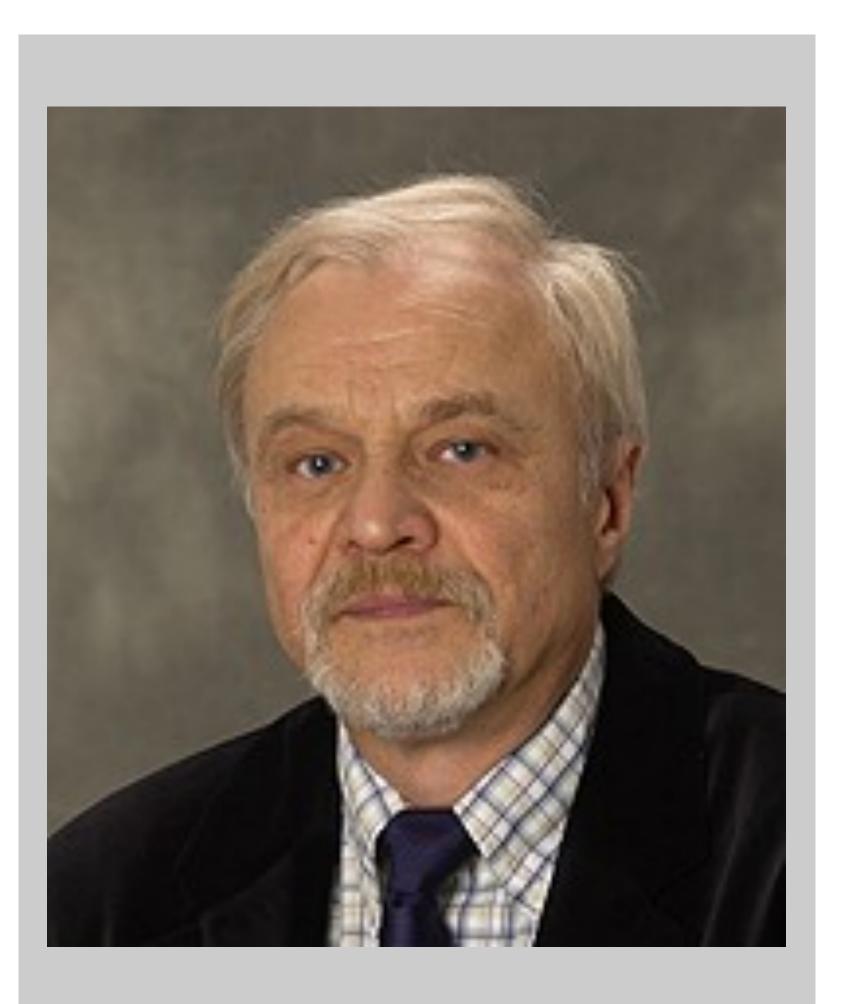
A novel process has been developed for the separation of hydrogen from coal gasification-based syngas components. The process is flexible so it can be used within the gasifier to separate hydrogen, or as a separate unit process.

The basic idea of the research was to design and apply solids to be used in a fixed-bed reactor that will increase the hydrogen yield as well as capture greenhouse gases in its matrix through reaction. The spent solids are regenerated



thermoneutrally while releasing sequestration-ready CO2.

These solids have been designed so that they have the maximum selectivity for the beneficial reactions while maintaining their structure and activity through the reaction-regeneration cycles. Iron (created by reduction of hematite with syngas) is the Boudouard catalyst and CaO is the CO2 removal material. Synthesized CaO has been found to provide better capacity and reaction rates as compared to commercially available CaO. In addition, these specially synthesized CaO-based sorbents show lower deactivation over multiple cycles.



Dr. Tomasz S. Wiltowski received his M.Sc. in chemical engineering from Technical University, Cracow, Poland in 1974 and a Ph.D. in catalysis from the Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences in 1984. At present, he is a Professor in the Department of Mechanical Engineering and Energy Processes, Director of the Coal Research Center, and Interim Director of the Materials Technology Center of Southern Illinois University at Carbondale, Illinois. His special interests include coal and biomass gasification, Fisher-Tropsch synthesis, and catalysis. He has received research grants from state, federal, and industrial sponsors totaling over \$8.5 million. He has published 64 journal articles and made 80 presentations at

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