

# Hydrogen for Greening Production in Heavy-Emitter Industries

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## ***Plenary Abstract***

Today, hydrogen is enjoying a strong momentum worldwide as the fuel of the future, and is expected to have a considerable role to play in securing a clean energy future. Nations of the world have been adopting national roadmaps to employ hydrogen for their transition plans to low-carbon future. However, it remains a challenge to find clean energy sources to drive the hydrogen production process and divest it from the fossil-based production technologies. Currently, demand of hydrogen is dominated by heavy industries including oil and gas, steel, cement, glass and fertilizers manufacturing, among other heavy emitters of CO<sub>2</sub>. This demand is met by reforming or gasification of carbon-based fuels (e.g., methane, coal, and biomass). In this talk, innovative thermochemical Copper-Chlorine (Cu-Cl) hydrogen production technology, developed at Ontario Tech University, is introduced as a reliable and scalable technology for clean Hydrogen production. The Cu-Cl hydrogen cycle can operate on recovered waste-heat (approximately 500°C) from industrial processes. In this talk, Prof. Gabriel will highlight the potential integration of this innovative technology in steel and cement industries in Canada and elsewhere in Europe, China and the Middle East. This process which utilizes waste/process heat has the potential to significantly cut of CO<sub>2</sub> emissions from such polluting industries. A case study on coupling this technology with a cement plant in Ontario will be presented.

**Keywords:** *Hydrogen, thermochemical Cu-Cl cycle, energy recovery, cement, steel*

## ***Short biography***

*Dr. Gabriel is an elected member of the Canadian Academy of Engineering and the former A/Deputy Minister of Research at the Ontario Ministry of Research and Innovation. In 1990, Dr. Gabriel attended the prestigious, MIT-founded, International Space University and received a diploma in Space Sciences. For over 14 years, Dr. Gabriel led an international team in the research efforts spearheaded by NASA to design, test and operate a thermal management system for the International Space Station (ISS). In 2004, Dr. Gabriel was invited to lead the development of the research and innovation ecosystem in a newly established university. He assumed the position of the founding AVP research and graduate programs at Ontario Tech University (formerly the University of Ontario Institute of Technology) in Ontario, Canada. Under his leadership, Ontario Tech University was ranked as one of the top Canadian higher learning institutions in the categories of innovation and leaders of tomorrow.*



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