



SOUTHERN AFRICAN HYDROGEN AND FUEL CELL CONFERENCE 2023

From fundamentals to accelerated integration



24-25 APRIL 2023 CONFERENCE
VENUE HAZENDAL WINE ESTATE
STELLENBOSCH, CAPE TOWN



ECSA AND SACNASP CPD POINTS WILL BE ALLOCATED PER HOUR ATTENDED

FINAL PROGRAMME

Conference Day 1- Monday 24 April 2023

08:00–08:30 **Registration**

08:30–08:35 **Welcome and Opening Address**
B. Xakalashé, *Conference Chairperson*

08:35–08:40 **Safety Briefing: Venue Official**

08:40–08:55 **SAIMM Presidential Address**
Z. Botha, *SAIMM President*

Session 1 - Session Chair:

D. Susac, *University of the Cape Town, South Africa*

08:55–09:25 **Keynote Address: Development of hydrogen fuel cell vehicles in South Africa**
S. Pasupathi, *University of the Western Cape, South Africa*

09:25–09:50 **A review on the development of metal electrocatalysts to produce green hydrogen from water electrolysis**
S.A. Jeza, A.H. Mohammadi, and D. Lokhat, *University of KwaZulu-Natal, South Africa*

09:50–10:15 **Cummins role in a decarbonized world**
A. Zhao, *Cummins Southern Africa Regional Organization, South Africa*

10:15–10:35 **Mid-morning refreshments**

Session 2 - Session Chair:

G. Patrick, *Mintek, South Africa*

10:35–11:05 **Keynote Address: Development and commercialization of fuel cell membrane electrode assemblies (MEA) at HyPlat**
F. Van Schalkwyk, *HyPlat, South Africa*

11:05–11:30 **The development of high surface area tantalum pentoxide as a support material for Pt electrocatalyst to enhance the oxygen reduction reaction in fuel cells**
A. Ngqalakwezi and G. Patrick, *Mintek, South Africa*

11:30–11:55 **Experimental investigation of dairy biogas as fuel for a Molten Carbonate Fuel Cell**
J. Milewski, K. Michalska, and A. Kacprzak, *Warsaw University of Technology, Poland*
Technical University of Lodz, Poland

11:55–12:20 **Hydrogen evolution reaction on molybdenum disulfide modified with metal organic framework and polymeric materials in acidic medium**

K.E. Ramohlola¹, E. Makhado¹, S. Raseale², M.J. Hato¹, E.I. Iwouha³, K. Makgopa⁴, and K.D. Modibane¹,
¹University of Limpopo, ²University of Cape Town, ³University of the Western Cape and ⁴Tshwane University of Technology, South Africa

12:20–12:45 **Performance of nitrogen-doped Ketjenblack as electrocatalysts**
T. Ngwenya, *Mintek South Africa*

12:45–13:45 **Lunch**

Session 3 - Session Chair

R. Hassanalizadeh, *Mintek, South Africa*

13:45–14:15 **Keynote Address: High-performance iridium-based electrocatalysts for proton exchange membrane water electrolysis**
R. Mohamed, *HySA Catalysis, South Africa*

14:15–14:40 **Metal-organic framework composites for hydrogen energy applications: Advances and challenges**
K.D. Modibane, *University of Limpopo, South Africa*

14:40–15:05 **Afternoon Refreshments**

15:05–15:30 **Prescriptive lifetime management for PEM fuel cell systems in transportation applications: Leveraging the potential of a modular framework for global, optimization-based post-prognostic decision-making**
S. Dirkes, *RWTH Aachen University, Germany*

15:30–15:55 **South Africa's fuel cell technologies, applications, and market**
T.K. Bungane, *Mintek, South Africa*

15:55–16:00 **Day 1 Conference Close**

16:00–18:00 **Network Cocktail Function**

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Conference Day 2 - Tuesday 25 April 2023

09:00–09:30	Registration	13:30–14:30	Visit 1: HySA Systems is hosted by the South African Institute for Advanced Materials Chemistry (SAIAMC) at the University of the Western Cape (UWC). HYSA Systems is a world-class hydrogen and fuel cell research and innovation facility, which has state of the art laboratories to conduct hydrogen research. The visitors will be able to see the labs with fuel cell testing stations, membrane electrode assembly manufacturing facility, bipolar plate manufacturing for fuel cell stacks using CNC milling and etching facilities, hydrogen storage including materials synthesis and compressors using metal hydride technology, fuel cell vehicle testing platform etc. The tour will be about 30 minutes long, starting with a brief of the technology and site visit.
09:30–09:35	Welcome and Opening Address B. Xakalashé, <i>Conference Chairperson</i>		
09:35–09:40	Safety Briefing: Venue Official		
	Session 4 - Session Chair: B. Xakalashé, <i>Mintek, South Africa</i>		
09:40–10:10	Keynote Address: Powering the hydrogen economy and Anglo American's hydrogen powered mine haul truck - A vital step towards reducing carbon emissions over time F. Smith, <i>Anglo American, South Africa</i>		
10:10–10:40	Keynote Address: Thermal management of 1 kW edge cooled PEM fuel cell stack I. Tolj, <i>University of Split, Croatia</i>		
10:40–11:00	Mid-morning Refreshments		
11:00–11:20	PEM fuel cell powered forklift utilizing advanced metal hydride hydrogen storage and refuelling at Impala Platinum Refineries I. Ferreira ¹ , M. Lototsky ² , D. Swanepoel ³ , and I. Tolj ⁴ , ¹ Impala Platinum, Ltd, South Africa, ² University of the Western Cape, South Africa, ³ TF Design (Pty), Ltd, South Africa, ⁴ University of Split, Croatia		
11:20–11:40	Enhancing hydrogen uptake in UiO-66 metal-organic frameworks: A comparative study of modified and pristine MOFs with tunable linker vacancies M. Ledwaba and R. Hassanalizadeh, <i>Mintek</i>		
11:40–12:00	Metal hydride materials and technologies developed at HYSA systems based at the University of the Western Cape M.W. Davids, M. Lototsky, V. Linkov, and S. Pasupathi, <i>University of the Western Cape, South African</i>		
12:00–13:00	Lunch	14:45	Buses return to Hazendal Conference Centre
13:00	Buses depart to technical visits		