

## Tuesday 9<sup>th</sup> July

### Name

### Affiliation

#### Session 0 - Introduction

Welcome

Energy storage challenges and opportunities for flow batteries

Daniel Averbuch

IFP Energies nouvelles

A view of energy storage in France, Europe

Patrick Clerens

European Association for the Storage of Energy

#### Session 1 - Panel Session: Recent progress in the flow battery industry – the corporate view

Applications and markets: large scale, small scale, mobile and emerging

Panel session

Andy Klassen

Avalon

Shin Han

H2 Inc

Brent O'Conner

Redflow

Guillaume Chazelet

Kemiwatt

Henrik Buschmann

Schmid Energy Systems

#### Session 2 - Recent news of flow battery installations

Thorsten Seipp

Volterion GmbH

Joseph Epoupa Mengou

Eni SPA

Toshikazu Shibata

SEI - Sumitomo

Doreen Burchell

Lockheed Martin

Market opportunities

Ali Davoodi

Iran

Andrei Usenko

Russia

Joep Piipers

Mexico

#### Session 3 - Panel session:

#### Promoting the business case for flow batteries and long duration energy storage

Mianyan Huang

VRB Energy

Gary Yang

UET

Mikhail Nikomarv

Bushveldt Energy

Scott McGregor

redT

Yu-Tack Kim

Korean Battery Industry Association

#### Evening drinks reception – sponsored by Oxkem

Our platinum sponsors:



Wednesday 10<sup>th</sup> July

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## Session 4 – Reducing costs of materials and components

Developing low cost, intrinsically safe flow batteries to meet the commercial challenge from competing battery technologies	Huamin Zhang	Dalian Institute of Chemical Physics
Raw material for vanadium electrolyte	Jens Burfeind	Fraunhofer UMSICHT
Performance enhancing stack geometry	Nicholas GuriEFF	UNSW School of Mechanical Engineering
Extruded bipolar plates	Mario Gillmann	Centroplast Engineering Plastics
Advancement of Nafion™ Membrane	Ruidong Yang	The Chemours Company
Cost reductions enabled by membrane innovations	Gregory Newbloom	Membrion

## Session 5 – flow battery operation and flow battery systems

Inverter based compensation of decreasing rotating mass in energy distribution systems	Jens Kaufmann	TRUMPF Hüttinger
Optimized auxiliary supply increases efficiency	Thomas Luth	Karlsruhe Institute of Technology
Influence of mass transport processes at dynamic loading conditions	Mikhail Pugach	Skolkovo Institute of Science and Technology
Hydrogen formation in flow batteries	Thomas Rabbow	AvCarb Material Solutions
The effects of current ripples on vanadium redox flow batteries	Parvez Akter	UNSW School of Mechanical Engineering

## Session 6 – Novel systems

Low cost zinc-iron rechargeable flow battery with high energy density	Alessandra Accogli	Politecnico di Milano
Hybrid hydrogen-vanadium cell	Trung Nguyen	University of Kansas
Tubular cell designs	Simon Ressel	Hamburg University of Applied Sciences
Activation of graphite felts using ozone/heat treatment	Hansung Kim	Yonsei University
Optimization of felt compression	Jiří Charvát	UCT Prague
Bonded carbon felt electrode-bipolar plate assemblies	Gaurav Gupta	DLR Institute of Networked Energy Systems
Thermally regenerative copper redox-flow battery coupled with slurry electrodes	Sunny Maye	EPFL-Valais-Wallis, Sion, Switzerland

Poster session

Evening dinner cruise – separate registration required

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**Thursday 11<sup>th</sup> July**

**Name**

**Affiliation**

**Session 7 - Materials properties and supply**

BCA catholyte and cell performance in H <sub>2</sub> /Br <sub>2</sub> flow batteries	Michael Kuettinger	Fraunhofer ICT
Crossover -tolerant platinum catalysts in H <sub>2</sub> /Br <sub>2</sub> flow batteries	David Zitoun	Bar-Ilan University
Failure analysis of the membrane electrode assembly in hydrogen-bromine flow batteries after accelerated cycling testing	Yohanes Hugo	Elestor
Electrode microstructure for redox flow batteries	Antoni Forner-Cuenca	MIT
Estimating membrane lifetimes for vanadium flow batteries with Ce(IV)	Fabio Oldenburg	Paul Scherrer Institut
Carbon felt electrode materials	Barbara Gonczi	Zoltek
Surface treatment of carbon felt electrodes and the associated impacts	Declan Bryans	Mersen
Limits of membrane thickness for practical applications	Bernd Bauer	Fumatech

**Session 8 - Technology panel on organic flow battery systems**

The use of organic electrolytes in flow battery systems	Michael Aziz	Harvard University
EnergyKeeper smart grid: Organic RFB in a practical application	Olaf Conrad	JenaBatteries
Electrochemical stability of selected quinone and viologen derivatives	Petr Mazur	University of Chemistry and Technology, Prague
Quinone based slurry electrodes in flow cell batteries	Fathima Fasmin	Qatar Environment and Energy Research Institute
Enhanced organic flow battery with solid boosters	Elena Zanzola	EPFL
Performance and stability of electrolytes for aqueous organic flow batteries	David Pasquier	IFP Energies nouvelles

**Session 9 - Reports from the field**

Characterisation of a 200 kW/400 kWh vanadium flow battery	Declan Bryans	University of Strathclyde
Purification of copper-contaminated vanadium electrolytes	Danick Reynard	EPFL
Modelling and analysis of mechanical behaviour, reliability and electrochemical performance	Ao Tang	Institute of Metal Research, Chinese Academy of Sciences
Real-time reservoir balancing and leak-free nonaqueous cell design for flow batteries	Kirk Smith	University of Oxford
Material, cell and stack characterization	Melanie Schroeder	J Schmalz
Multifunctional hybrid compensator	Jan Girschik	Fraunhofer Umsicht
High temperature stabilization of electrolyte for vanadium flow battery	Baoguo Wang	Tsinghua University
Design of flow fields for a large area cell of a VRFB	Sreenivas Jayanti	Indian Institute of Technology

**Presentations and closing comments**

**The conference is expected to conclude by 16:30**

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