**École polytechnique fédérale de Lausanne (EPFL) Valais/Wallis**
Institute of Chemical Sciences and Engineering (ISIC)
Basic Science Faculty (SB)
Energypolis, Rue de l'Industrie 17, CH-1950 Sion, Switzerland

# EPFL Valais/Wallis SEMINAR

15. 05. 2024, 14:00 - 14:30, EPFL Valais/Wallis in Sion, 4th floor, Zeuzier Room

## High-throughput experimentation in Materials Science

**Dr. Cedric David KOOLEN**

SCIDENTIFY, LMER-EPFL-Valais, Sion, Switzerland

High-throughput experimentation (HTE) has found widespread application in medical chemistry: i.e., lead identification, optimization and toxicology experiments are multidimensional problems that greatly benefit from a high-throughput approach. In catalyst synthesis and screening, similar multidimensionality exists, but has histrorically been tackled in a trial-and-error human-lead fashion: which is painstaikingly slow. Using HTE, the vast dimensionality of catalyst properties: either in its conception (synthesis) or its performance can be addressed much more time- and resource-friendly. We will discuss two methods for both the characterization and productions of nanoparticles based on plasma that offers HTE capabilities: inductively coupled plasma mass spectrometry[1] and spark ablation.[2] Combined with aritificial intelligence, HTE can make a tremendous contribution to materials science exploration and acceleration towards the solutions to the urgent problems of todays society.

References:

(1) Koolen, C. D.; Torrent, L.; Agarwal, A.; Meili-Borovinskaya, O.; Gasilova, N.; Li, M.; Luo, W.; Züttel, A. High-Throughput Sizing, Counting, and Elemental Analysis of Anisotropic Multimetallic Nanoparticles with Single-Particle Inductively Coupled Plasma Mass Spectrometry. *ACS Nano* **2022**. https://doi.org/10.1021/acsnano.2c01840.

(2) *Scalable synthesis of Cu(-Ag) oxide clusters via spark ablation for the highly selective electrochemical conversion of CO2 to acetaldehyde*. https://doi.org/10.21203/rs.3.rs-3791391/v1.

CV: Dr. Cedric David KOOLEN

Born in 1994 in the Netherlands, Cedric David Koolen graduated with a B.S. in Medical Sciences from the Vrije Universiteit Amsterdam in 2015. He then went on to pursue further undergraduate studies at the University of Amsterdam and Lund University obtaining a double degree in Chemistry and Physics in 2019. The same year he joined EPFL for is graduate studies, obtaining his doctoral degree in 2023 nomiated for the top 8% graduates. His thesis work explored new characterization and catalyst synthesis techniques as well as electrocataltic solution for the energy transition. He is the signee of three patents. As of 2024 he is principle investigator at EPFL at incubated with his start-up SCIDENTIFY at the Laboratory of Materials for Renewable Energy.

.