



REGISTER FOR THIS ONE-DAY COURSE AT TMS2024:

Hydrogen as Energy Carrier and Reductant in Metallurgical Applications

Date: Sunday, March 3, 2024 | **Time:** 8:30 a.m. to 5:00 p.m. | **Sponsored by:** TMS Pyrometallurgy Committee

ABOUT THIS COURSE

Hydrogen can be used as energy carrier (fuel) in burners, or it can be used as a reducing agent. This one-day course discusses aspects related to burners such as burner design, key operational parameters, burner conversion from fossil fuel to hydrogen, and the impact of switching to hydrogen burners on furnace operations. Furnace design, process control, heat distribution and transfer, as well as off-gas management and waste heat are included. The scope of this course includes use as a reducing agent in both ferrous and non-ferrous metals applications. The mechanisms, key factors, process parameters, and equipment are covered, for solid and molten state. Furthermore, safe working with hydrogen and the production and supply infrastructure of hydrogen will be discussed. The course will use a mix of presentations, including industry experience and problem-based breakout groups, to provide a dynamic environment with lots of interaction.

WHO SHOULD ATTEND?

This course is designed for professionals working in industry and national labs with at least several years of experience after M.Sc. graduation.

LEARNING OBJECTIVES

- 1) Understand the state of the art, challenges, and future developments in hydrogen production (production routes, equipment, volumes, costs, etc.) generally and in a metallurgical context, to enhance operational and research activities and decision-making within their organization.
- 2) Obtain deep insight into key factors that are important when considering hydrogen-based burners, including burner design, costs, burner conversion, and implementation possibilities.
- 3) Understand the opportunities and limitations of hydrogen as a fuel, how the use of hydrogen burners impacts furnace operations, and what practical mitigating measures need to be taken.
- 4) Understand opportunities and limitations for hydrogen as a reductant, in iron and steelmaking and non-ferrous applications, including the fundamental (reaction) mechanisms and how these impact the practical operations. Equipment selection and feed preparation. They can derive actions to take in their own practical operations.

- 5) Know the key safety aspects for designing equipment, processes, and safe operations. This includes: understanding mixing of gases, ignition temperature concept, materials selection, and how to translate this into daily practice in lab or fab.
- 6) Apply their new knowledge in a problem-based learning setting, learning from and with each other and being coached by the course experts.
- 7) Understand how to use hydrogen in an industrial setting as energy carrier or reducing agent in a safe way, including opportunities and risks.

INSTRUCTORS

Halvor Dalaker, SINTEF
Christina Meskers, SINTEF
Martin Adendorff, Linde
Dierk Raabe, Max Planck Institut f. Eisenforschung

REGISTRATION RATES

| Category | Early Rate* | Standard Rate** |
|-------------------|-------------|-----------------|
| Member | \$585 | \$685 |
| Nonmember | \$715 | \$815 |
| Student Member | \$375 | \$425 |
| Student Nonmember | \$405 | \$455 |

*Early Registration Rate: On or Before January 31.

**Standard Registration Rate: After January 31.

HOW TO REGISTER

Sign up for this course when you register for the TMS 2024 Annual Meeting & Exhibition or add this course to an existing registration.



Scan the QR code or visit:
www.tms.org/TMS2024/PD

Register by **January 31** for the best rates!