第　　回機械システムセミナー

第　　回広大　　セミナー

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A3-131　　Teams

URL　136　138　ACE　Green ironmaking technological development: an integrated experimental and numerical approach

Prof. Yali Tang

Prof. Yali Tang is an assistant professor in the Power and Flow Section, Department of Mechanical Engineering, Eindhoven University of Technology (TU/e), the Netherlands. She received her PhD degree in Chemical Engineering at TU/e in 2015, with the thesis entitled ‘Direct Numerical Simulations of Hydrodynamics in Dense Gas-Solid Flows’. She then continued at TU/e as a Postdoc working on ‘Micro-mechanics of wet solids in gas-solid contactors’. In 2017 she started her current position, focusing on research areas of multiphase flows, CFD, fluidization, and electrolysis. Application-driven fundamentals are her key interests. She is an Early Career Editorial Board member of Chemical Engineering Science journal. Among her involvement in many national and international academic circles, importantly she is a member of organization committee of the J.M. Burgerscentrum (JMBC) annual symposiums, which connect the entire fluid mechanics community in the Netherlands.

Abstract

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Driven by green ironmaking/steelmaking for the energy transition (e.g., the Metal-enabled Cycle of Renewable Energy), developing reduction technologies of iron oxides to metallic iron regarding the use of clean energy, no emissions of CO2 and particles, and less energy consumption is urgent. In this talk, I will give an overview of our recent research on two green ironmaking methods, i.e., hydrogen-based direct iron reduction (DRI) and iron electrolysis.

A combined experimental and numerical approach is employed to gain a fundamental understanding of the underlying physics and reaction mechanisms. In particular, we have built a comprehensive computational model for simulating large-scale multiphase reactive flows. This is an essential enabler for the reactor and process design/optimization of DRI.