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L.P.H. de Goey is professor of combustion technology and dean of the Department of Mechanical Engineering at Eindhoven University of Technology, secretary of the Combustion Institute Executive Committee and chair of the board of the Metalot Innovation Center. He received his Ph.D. at the Department of Physics of the same university.

He was co-editor of the Proceedings of the Combustion Institute and co-authored over 400 scientific publications. In 2010 he was received the 'Simon Stevin Meester' Award, this is the highest Dutch award in the area of technical sciences, in 2018 he became fellow of the CI and in 2020 he received a prestigious ERC advanced grant on metal fuel combustion.

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Secretary, The Combustion Institute

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The Combustion Institute Roles

Co-Editor, Proceedings of the Combustion Institute, 2010-2013

Chair, Dutch Section of the Combustion Institute (DSCI), 1996-2000

Coordinator & Colloquium Co-Chair, Laminar Flames colloquium, 31st and 32nd International Symposia on Combustion

Member, Board of Directors 2004-2016

Member of many committees of the Combustion Institute, like the Program Committee, Editorial and Nominations Committee and Silver Medal Committee, New Initiatives and Awards Commitee

Title: **Metal Energy Carriers: Renewable Fuels of the Future**

Abstract

Metals have superior energy density compared to fossil fuels and hydrogen. Therefore, metal powders have gained interest as fuel material for energy storage. The main benefits of metal fuels are the absence of CO2 emissions during combustion and the potential to be restorted in existing solid fueled power plants and transportation infrastructure. During combustion of the metal powders, metal oxides are formed. These metal oxide particles are captured and reduced back to the original metallic powders with energy from renewable sources, to close the metal energy cycle. Iron is one of the most attractive metal energy carriers, as 1) iron combusts heterogeneously in air at atmospheric pressure which results in relatively large iron oxide particles that are easily captured and 2) the iron oxides can be regenerated to metallic iron using green hydrogen. This novel energy carrier benefits from the possibility of using existing technology redesigned for this new application. Still, iron combustion, reduction and the consequences for the system design are far from understood. Much research is required to increase the technological readiness level for practical application of metal energy carriers. For fundamental understanding of the combustion, numerical and experimental studies are conducted on the combustion. In this presentation, main results of important underlying fundamental studies on combustion are presented.

