

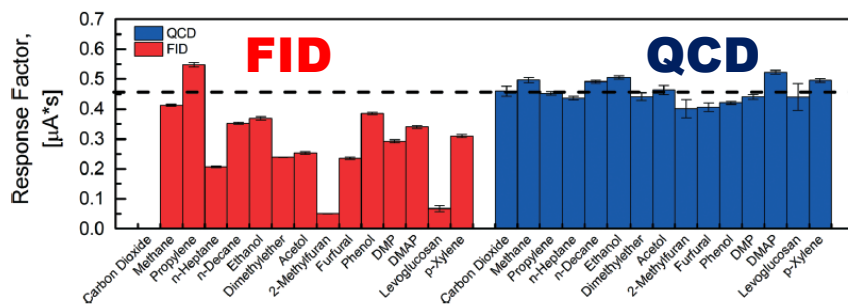
3D-Printed Catalytic Microreactor for Characterizing Fuel Mixtures – Quantitative Carbon Detector (QCD)

Scientific Achievement

3D-printed microchannel reactor optimizes sequential catalytic reactions for quantification of complex fuel mixtures for carbon balance closure without calibration.

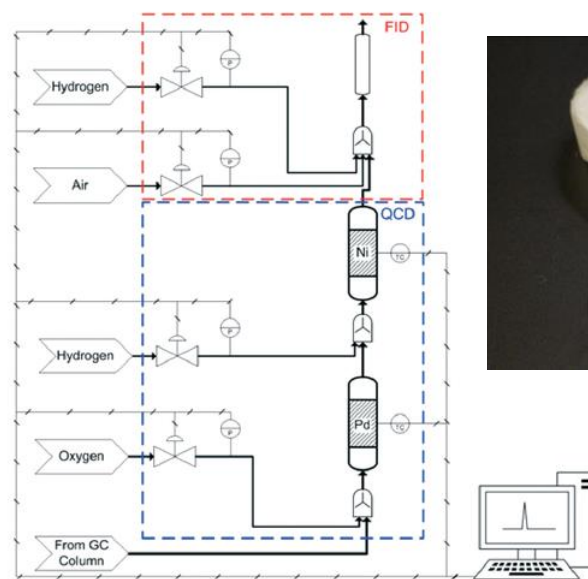
Significance and Impact

- Quantification of 100s of chemical compounds enables research with complex fuels
- Provides design of 3D printed microreactor for small-scale deployment
- Transferred to startup company (ARC, Inc.); already in beta testing with major companies



Research Details

- Modeling of hydrocarbon ($C_xH_yO_z$) oxidation and methanation validates reactor design
- Integrated microchannel system maximizes chemical resolution upon separation for broad range of chemicals
- Fibrous catalyst support allows for high catalyst density and low reactor pressure drop



S. Maduskar et al., *Lab on a Chip*, 2015, 15, 440-447.



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Work was performed at the University of Minnesota by Dauenhauer group
CATALYSIS CENTER FOR ENERGY INNOVATION

