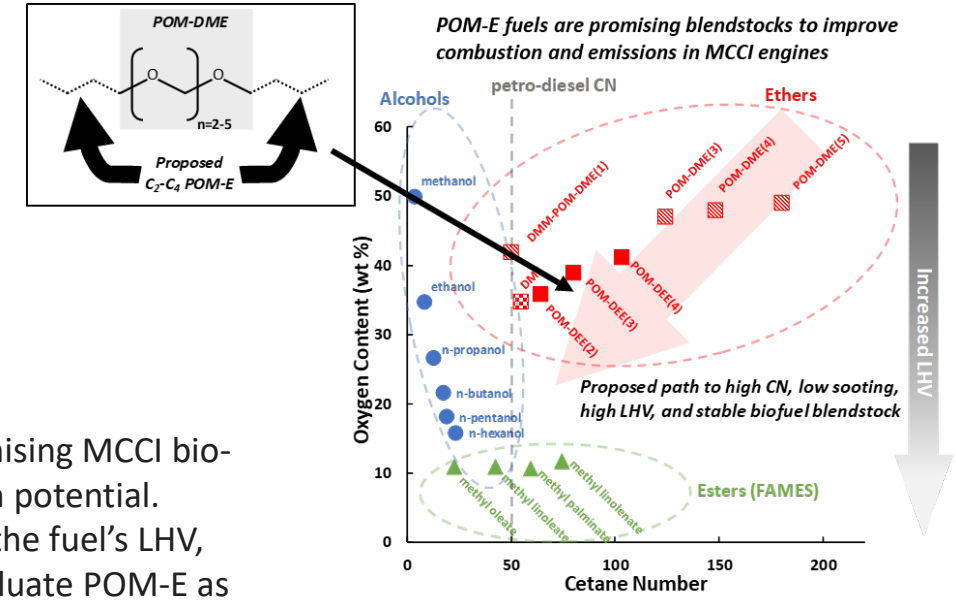
Poly(oxymethylene) Ethers (POM-E) as a High Cetane, Low Sooting Biofuel Blendstock for Use in MCCI Engines

Goals

Optimize composition of a diesel bioblendstock comprised of poly(oxymethylene) ethers with extended end functional groups that demonstrate >50% reduction in greenhouse gas emissions relative to conventional diesel fuel, reduction in soot emissions and meet ASTM D975 diesel fuel specifications.



Approach

POM-E produced from lignocellulosic feedstocks are promising MCCI bio-blendstocks with high cetane numbers and soot reduction potential. Extending the end groups from C1 to C2-C4 can enhance the fuel's LHV, water solubility, and oxidative stability. This study will evaluate POM-E as a potential MCCI fuel through sustainability analysis, fuel characterization, soot/ignition chemistry modeling, and engine testing.

Potential Impact on Co-Optima Goals

This study will be the first to comprehensively investigate C_2-C_4 POM-E bio-blendstocks. High level characterization of the POM-E fuels will enable engine co-development to maximize energy conversion efficiencies and minimize pollutant formation in MCCI engine platforms. This study will identify viable low-carbon footprint and cost-effective production pathways for POM-E needed for scale-up.

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