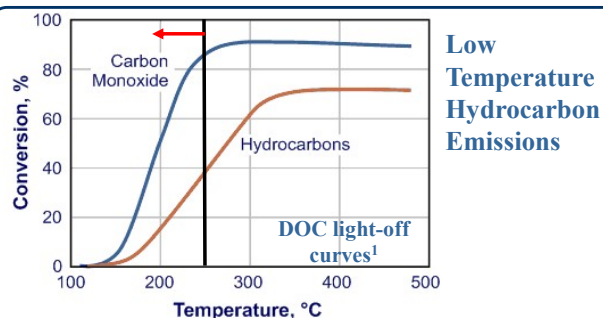
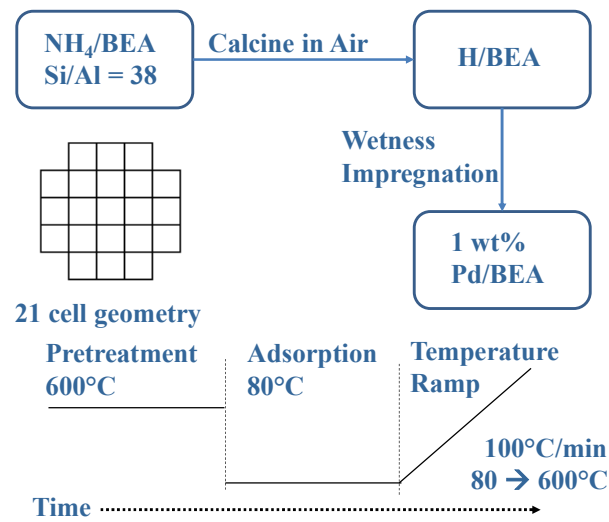


## Motivation – Hydrocarbon Emissions



## Experimental Methods

### Synthesis & Experimental



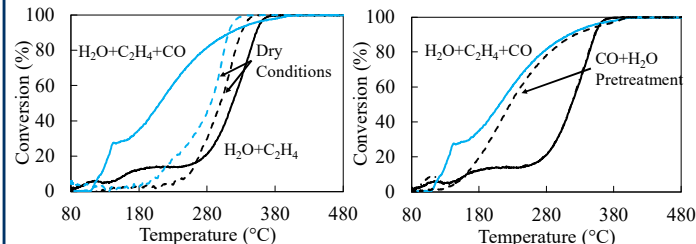
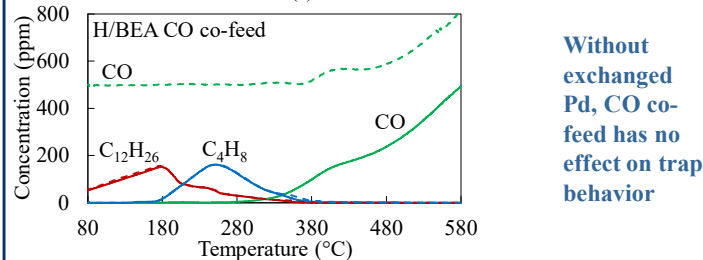
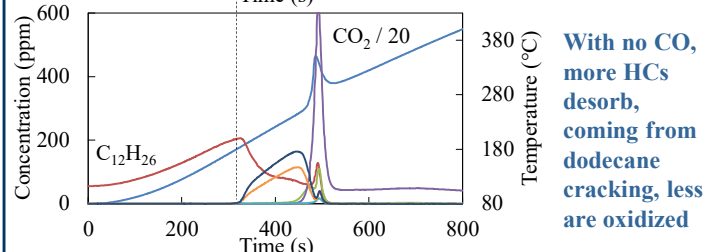
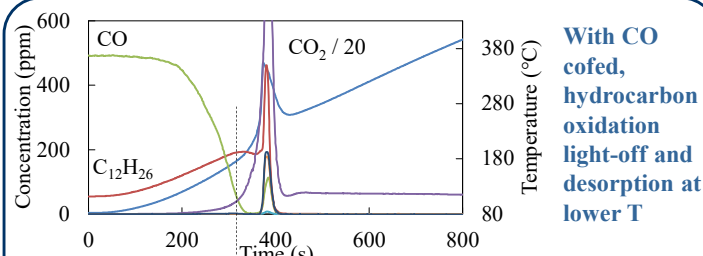
## References

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## Acknowledgements

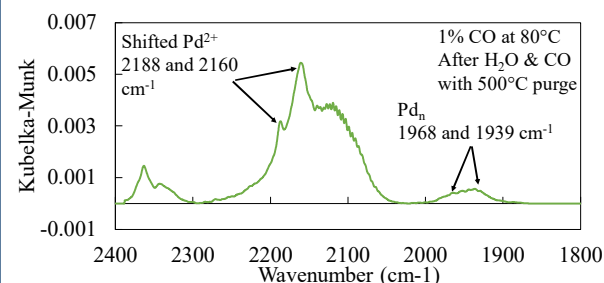
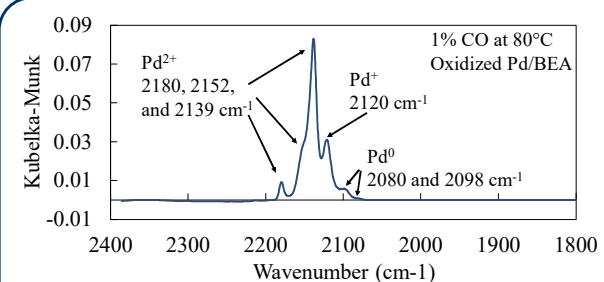
The authors would like to thank the Department of Energy, Vehicle Technologies Office (DE- EE0008233) for financial support.

## Pd/BEA – CO Co-Feed



- Ethylene fed with CO and H<sub>2</sub>O leads to lower HC oxidation light-off temperature.
- A CO pretreatment in the absence of H<sub>2</sub>O had no effect on light-off behavior.
- Enhanced light-off phenomenon requires both CO and H<sub>2</sub>O present simultaneously.

## CO DRIFTS



- After CO and H<sub>2</sub>O treatment, species at 1966 and 1939 cm<sup>-1</sup> appear, indicating particulate Pd<sup>0</sup>
- Ionic Pd species at 2139 cm<sup>-1</sup> disappear
- Evidence for reduction from low temperature H<sub>2</sub>O and CO treatment

## Conclusions

- CO co-feed in the presence of H<sub>2</sub>O leads to a change in hydrocarbon oxidation light-off behavior on Pd/BEA.
- CO pretreatment in dry conditions leads to no change in oxidation behavior, however a pretreatment of CO and H<sub>2</sub>O leads to oxidation behavior similar to a constant feed of these species with C<sub>2</sub>H<sub>4</sub>.
- DRIFTS studies revealed that after treatment at 80°C in CO and H<sub>2</sub>O, several ionic Pd species disappeared from the spectrum while features indicative of particulate Pd arose, which may be the culprit of changed oxidation behavior.