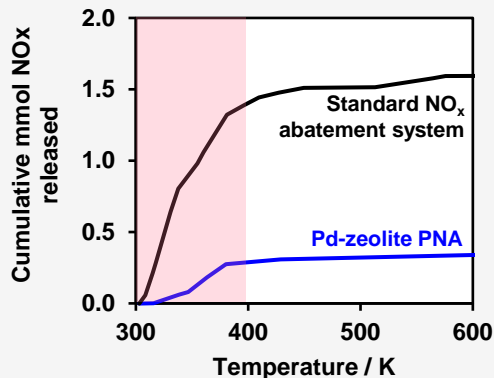
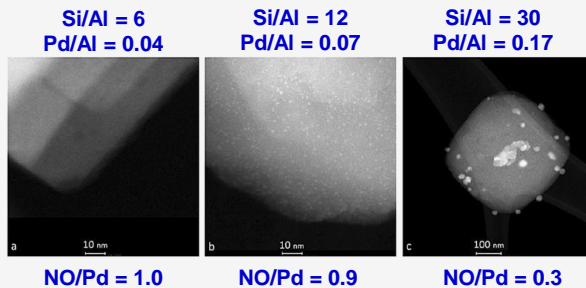


Transient vehicular conditions motivate understanding of Pd structures

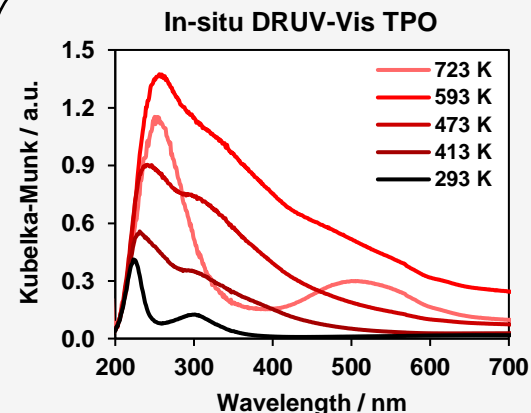


- Majority of NO_x released below 400 K¹
- Pd-zeolites are effective passive NO_x adsorbers (PNA)²



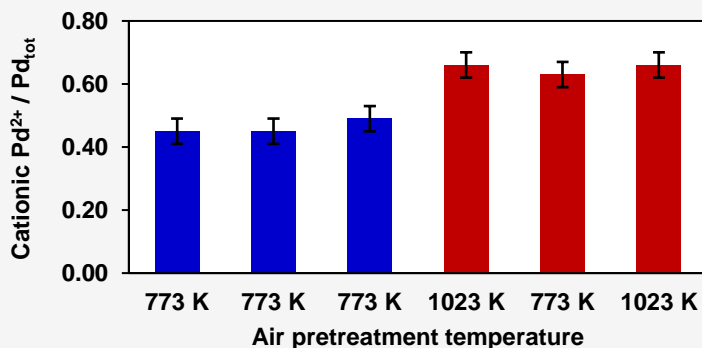
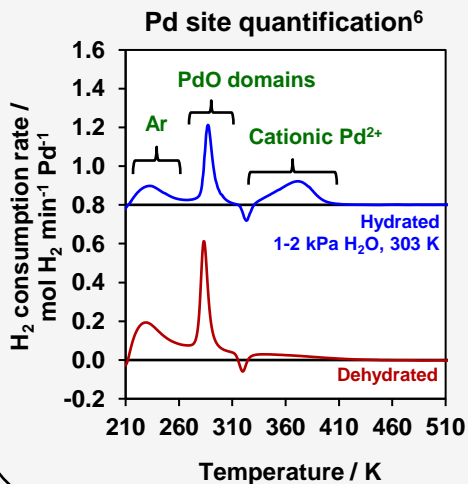
- Single-site Pd²⁺ cations are purported PNA storage site
- Bulk Al density influences formation of Pd²⁺ cations³
- What are the mechanisms of Pd²⁺ cation formation?
- How does zeolite material properties and treatment conditions influence formation of Pd²⁺ cations?

Formation of single-site Pd²⁺



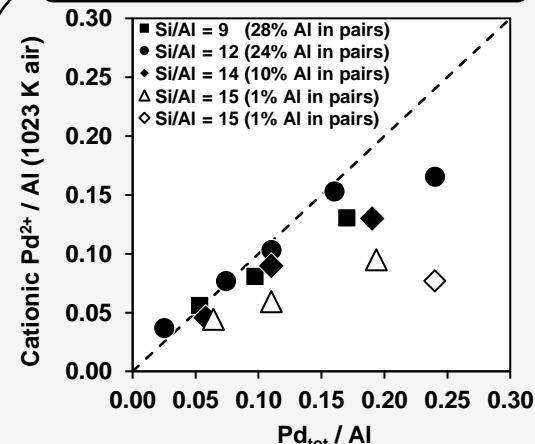
[Pd(NH₃)₄]²⁺ agglomerates before converting to single-site Pd²⁺ in air^{4,5}

Reversible formation of Pd²⁺ infers changes in spatial distribution



- Hydrating Pd²⁺ cations allows for accurate quantifications⁷
- 1023 K air increased the reversible formation of Pd²⁺ cations likely by changing the spatial distribution of Pd

Atomic-scale Al properties



6-MR paired Al sites (quantified by Co²⁺ titration)⁸ are preferred Pd²⁺ site