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Regeneration of a sulfur-poisoned methane combustion catalyst: Structural evidence of Pd_4S formation

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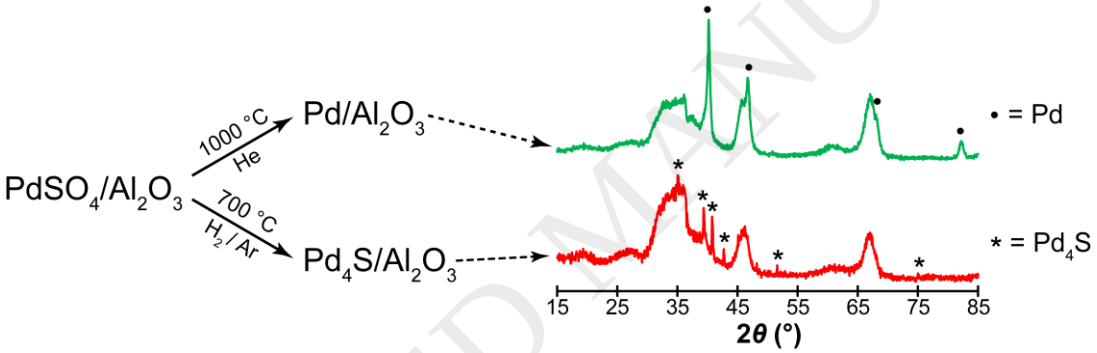
Graphical abstract



Highlights

- Regeneration of a methane combustion catalyst was studied using a $PdSO_4/Al_2O_3$ model system.
- $PdSO_4$ behaves differently under inert and reductive atmospheres.
- Decomposition of $PdSO_4$ under inert atmosphere resulted in the formation of metallic Pd.
- Formation of Pd_4S was observed in decomposition of $PdSO_4$ under reductive atmosphere.
- Threshold temperature of sulfur removal (about 500 °C) was observed in the regeneration under reductive conditions.