

Promoting formic acid dehydrogenation over Pd/C catalyst by adding Ce precursors

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Formic acid has been a promising clean hydrogen source due to its hydrogen density, abundance, nontoxicity and ease of transport and storage. Pd-based catalysts were mainly used to decompose formic acid into hydrogen and CO₂. Several studies have been investigated about formic acid dehydrogenation(FAD) reactions with various reaction factors, but those studies were only focusing on catalysts.

We investigated the promotion of the FAD reaction over Pd/C catalyst by adding Ce precursor to the reactant medium. The addition of Ce precursors caused an increase in the amount of gas product compared to the reaction without Ce addition. In particular, the addition of Ce(III) nitrate precursor showed the best promoting effect while no CO was produced.

We also researched the correlation between Ce concentration and the reactivity by increasing the Ce concentration from 0 to 45.5 times that of Pd. The reactivity increased until the concentration of Ce was equal to that of Pd, but the extra Ce precursor addition showed negligible impact. From this, we could conclude that the addition of Ce precursor can enhance the reactivity by affecting Pd metal rather than the reactant.