



Highly-efficient and autocatalytic reduction of NaHCO_3 into formate by in-situ hydrogen from water splitting with metal/metal oxide redox cycle

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Highlights

- Zn, Al, Mn, Fe exhibit excellent ability of dissociation of water with NaHCO_3 under hydrothermal conditions.
- The *in situ* produced hydrogen possesses high activity for hydrogenation of $\text{NaHCO}_3/\text{CO}_2$ into formate/formic acid.
- The metal oxidized products, such as ZnO , MnO , $\text{Fe}_3\text{O}_{4-x}$, act as autocatalysts for $\text{NaHCO}_3/\text{CO}_2$ reduction.
- A highly-efficient approach for reduction of NaHCO_3 into formate was achieved by coupling with a metal/metal oxide redox cycle.

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