# **Accepted Manuscript**

Highly-efficient and autocatalytic reduction of NaHCO<sub>3</sub> into formate by in-situ hydrogen from water splitting with metal/metal oxide redox cycle

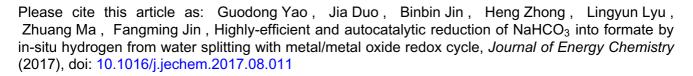
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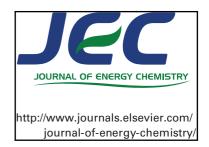
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### ACCEPTED MANUSCRIPT

## **Highlights**

- Zn, Al, Mn, Fe exhibit excellent ability of dissociation of water with NaHCO<sub>3</sub> under hydrothermal conditions.
- The in situ produced hydrogen possesses high activity for hydrogenation of NaHCO<sub>3</sub>/CO<sub>2</sub> into formate/formic acid.
- The metal oxidized products, such as ZnO, MnO, Fe<sub>3</sub>O<sub>4-x</sub>, act as autocatalysts for NaHCO<sub>3</sub>/CO<sub>2</sub> reduction.
- A highly-efficient approach for reduction of NaHCO<sub>3</sub> into formate was achieved by coupling with a metal/metal oxide redox cycle.

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