

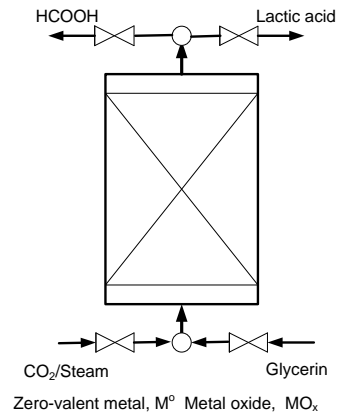
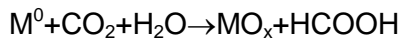
## Lactic Acid from CO<sub>2</sub> in a Hydrothermal Conversion with Chemical-Looping Technology

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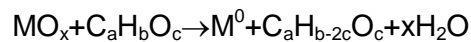
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Figure 1 shows the reduction of CO<sub>2</sub> to produce formic acid using the oxidation of a zero-valent metal (Zn, Al, Fe, Mn, Ni) under hydrothermal conditions in periodically operated CLT in packed bed system with the following main reactions

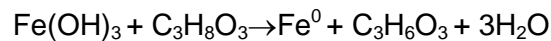


**Figure 1.** CO<sub>2</sub> conversion to formic acid in periodically operated CLT in packed bed system.

The oxidized metal can be regenerated by a chemical such as 'glycerin', which is converted to lactic acid



For example, by using Fe(OH)<sub>3</sub> we have



The reduction of Fe<sup>3+</sup> into Fe is closer to complete. The overall reaction with glycerin is exothermic

