

Development of efficient Bio-nano system for conversion of CO<sub>2</sub> to formate through bioelectrochemical process

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The fixation of CO<sub>2</sub> is one of the most important approaches to prevent global warming. The enzymatic reduction of CO<sub>2</sub> using formate dehydrogenase (FDH) has been widely studied to produce valuable chemicals such as formic acid and methanol. In this presentation, NADH dependent formate dehydrogenase was selected for the reduction reaction of CO<sub>2</sub> to produce formate. For the regeneration of NADH, electrochemical process was adapted. Similar electrochemical system was also applied to NADH-independent formate dehydrogenase, which does not require expensive NADH any longer. Successful development of CO<sub>2</sub> reductase through protein engineering of formate dehydrogenase as well as efficient reducing power supply system will guarantee the bioelectrochemical process for the production of formate from CO<sub>2</sub>.