

# Novel CO<sub>2</sub> Reduction Method

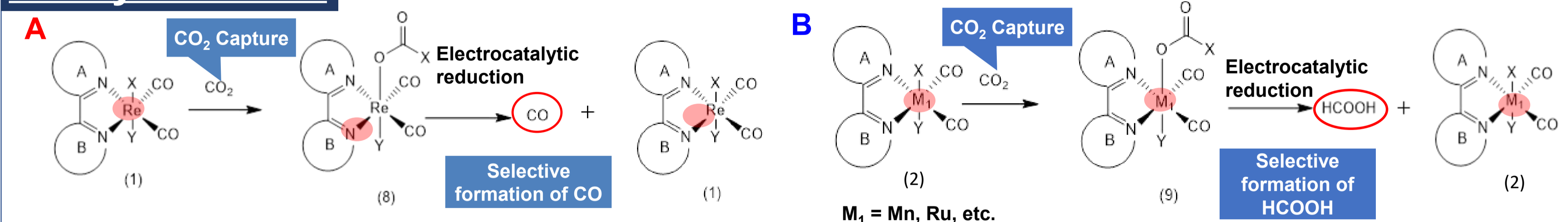
## Capturing of CO<sub>2</sub> from low concentration gas by using an Electrocatalysts

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### 1. Background

- Our electrocatalysts are useful for removing low concentrations of CO<sub>2</sub> in combustion gases generated from thermal power plants and garbage incineration plants.
- Combustion gas discharged from these plants contains only a small amount (at most a dozen percent) of CO<sub>2</sub>. Some extra process is required to apply CO<sub>2</sub> condensation technologies developed by using amines, MOFs, and filters.
- The electrocatalysts are capable of capturing and reducing CO<sub>2</sub> at the same time in the low CO<sub>2</sub> concentration.

### 2. Key Features



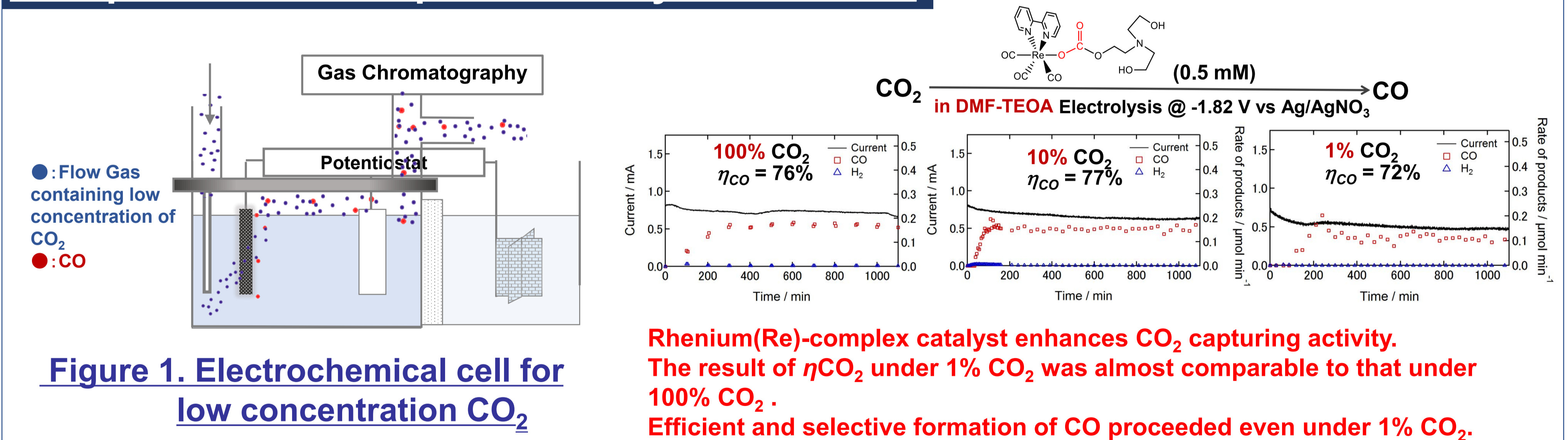
#### A. Rhenium-complex electrocatalysts

- ◆ The complexes can efficiently capture CO<sub>2</sub> from low concentration CO<sub>2</sub> (0.03% – 100%).
- ◆ Pressurization is not necessary.
- ◆ Electrochemical reduction selectively gives CO.

#### B. Metal (M<sub>1</sub>)-complex electrocatalysts (M<sub>1</sub> = Mn, Ru, etc.)

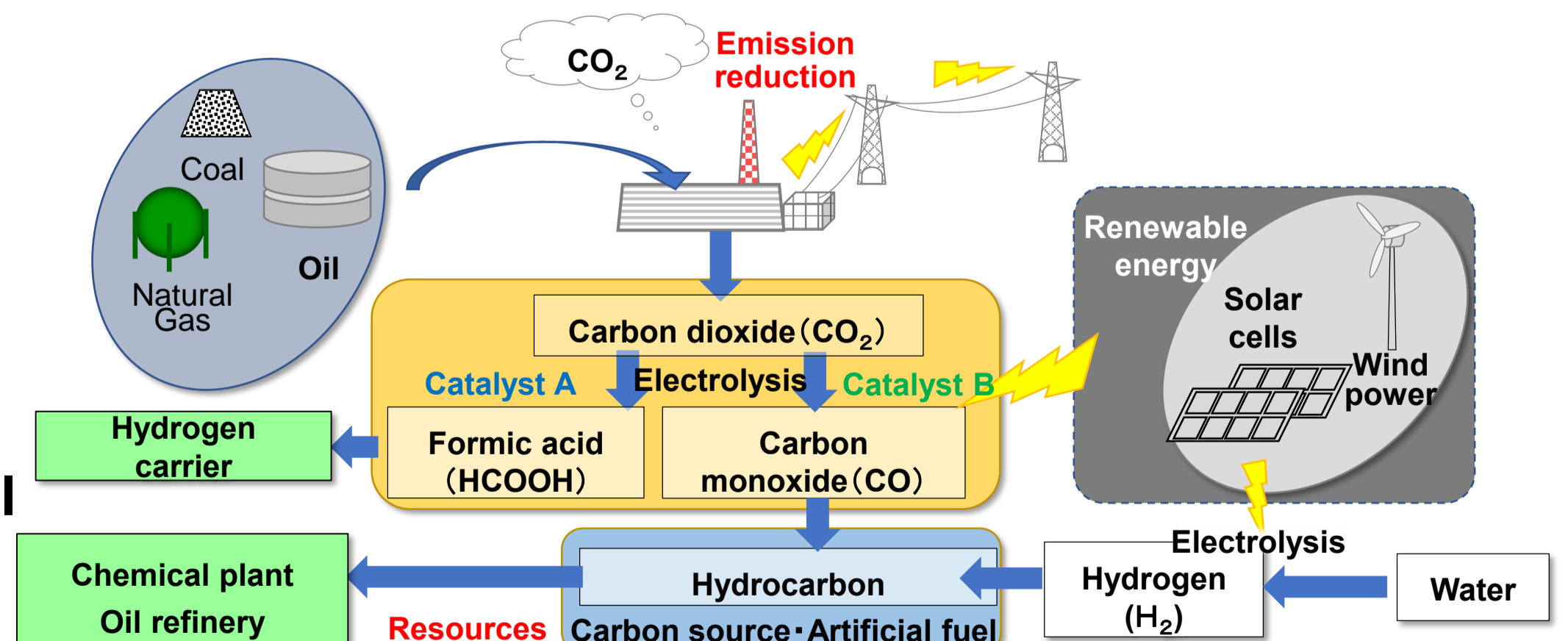
- ◆ The complexes can efficiently capture CO<sub>2</sub> from low concentration CO<sub>2</sub> (0.03% – 100%).
- ◆ Pressurization is not necessary.
- ◆ Electrochemical reduction selectively gives HCOOH.

### 3. Experimental Setup of Electrolysis and Data



### 4. Application Examples

- ① The electrocatalysts convert CO<sub>2</sub> to CO or HCOOH in the low concentration CO<sub>2</sub> atmosphere.
- ② The obtained CO can be used in the steel industry, or C1 chemistry.
- ③ The obtained HCOOH can be used as fuel for a fuel batteries.



### 5. Patent Licensing Available

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