

-7- (1) Methane production
from carbon dioxide

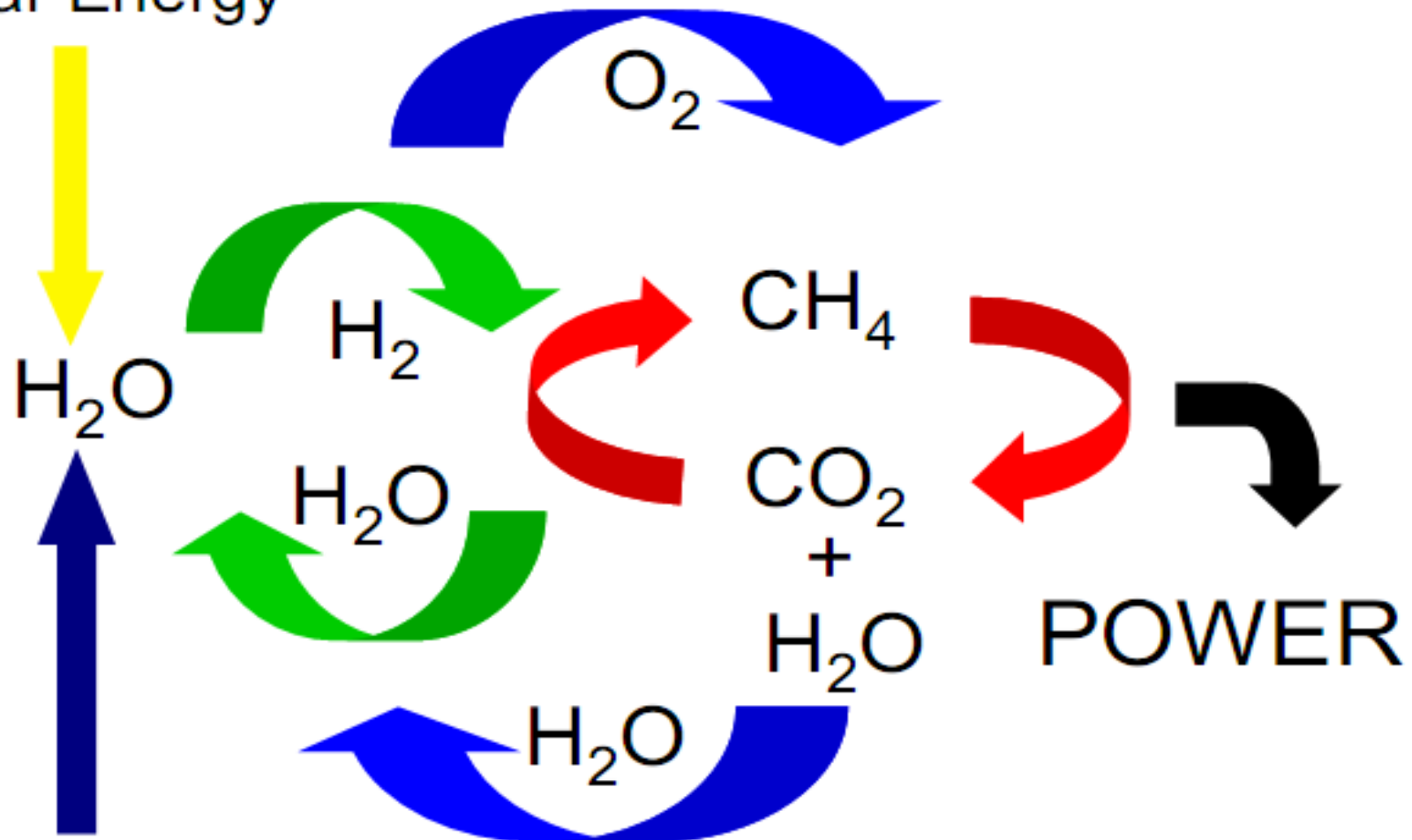
bp view on CO₂ as a raw material

EMRS Presentation – Paris, 5th February 2008
Martin E. Carrera, Manager Biotechnology Programme

CO₂/CH₄ opportunity (technical)



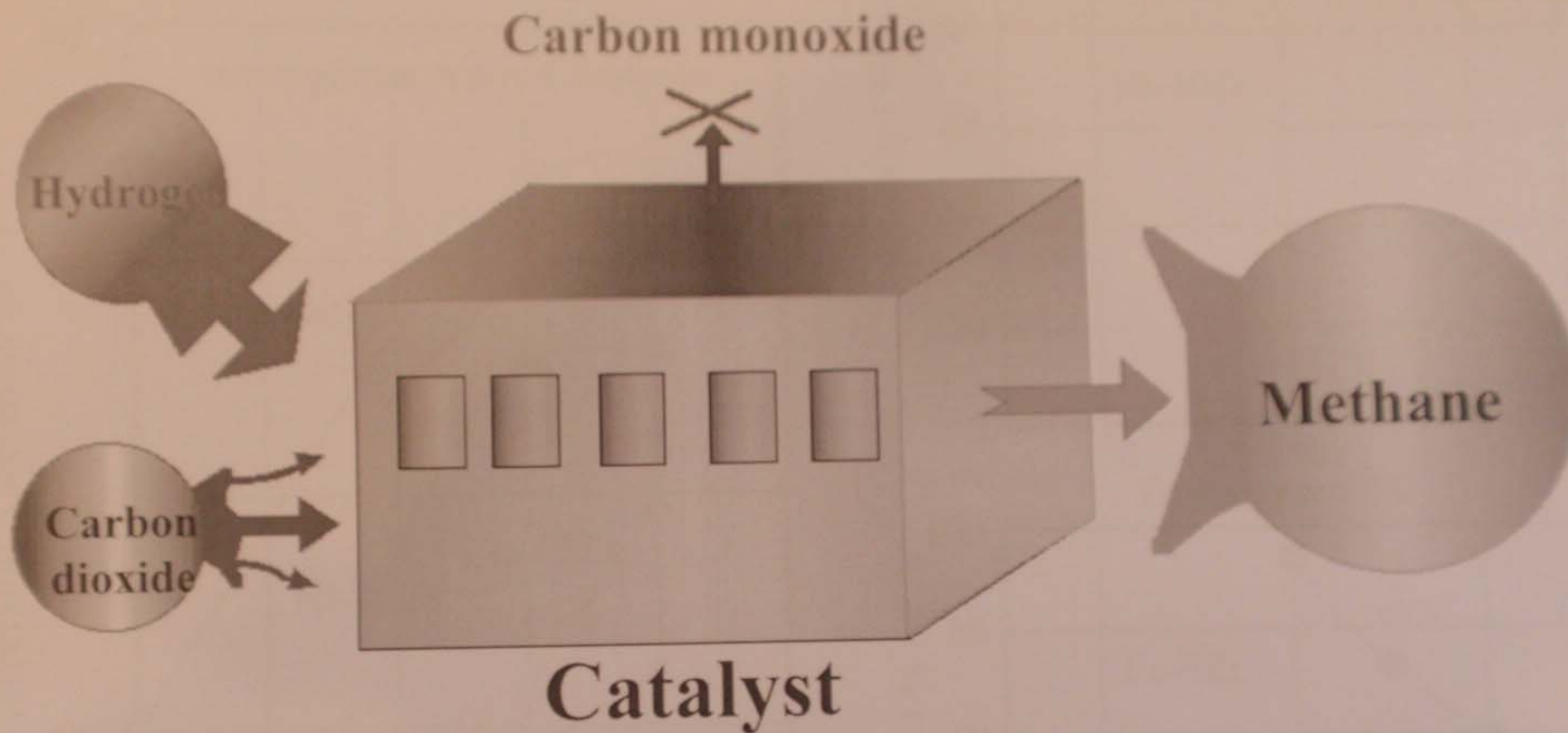
Solar Energy



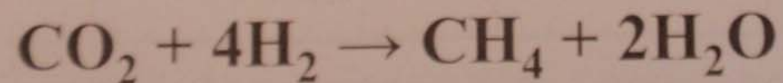
Sea Water

Electrochemical process

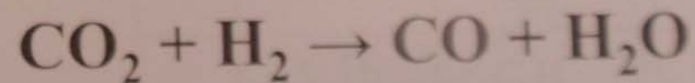
- Electrolysis of water for hydrogen production and catalytic material for high selectivity reactions
- The goal : $\text{CO}_2 + 4\text{H}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$
- $\Delta H = -165 \text{ Kcal/mol}$



Necessary reaction



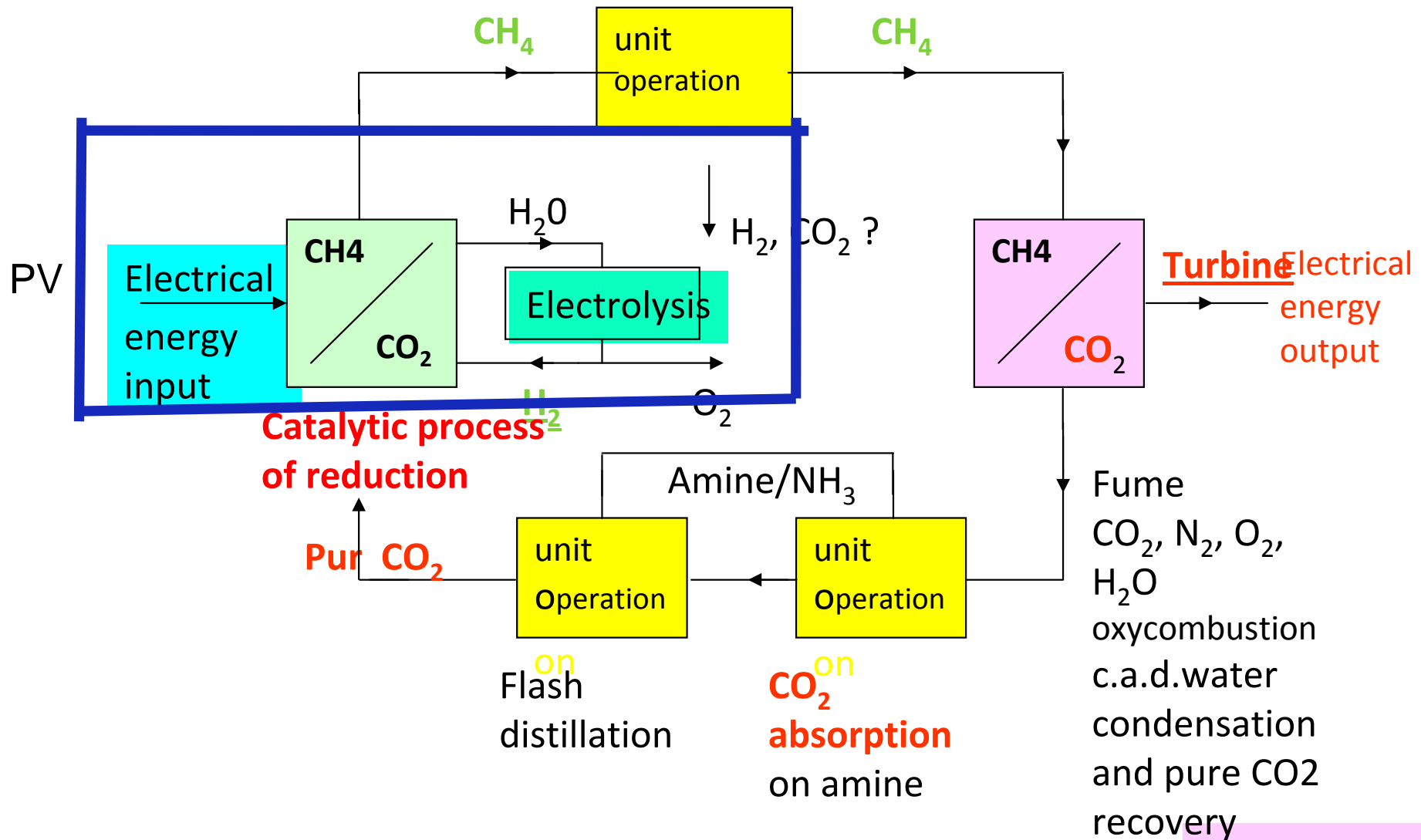
Reaction should not occur



Poison

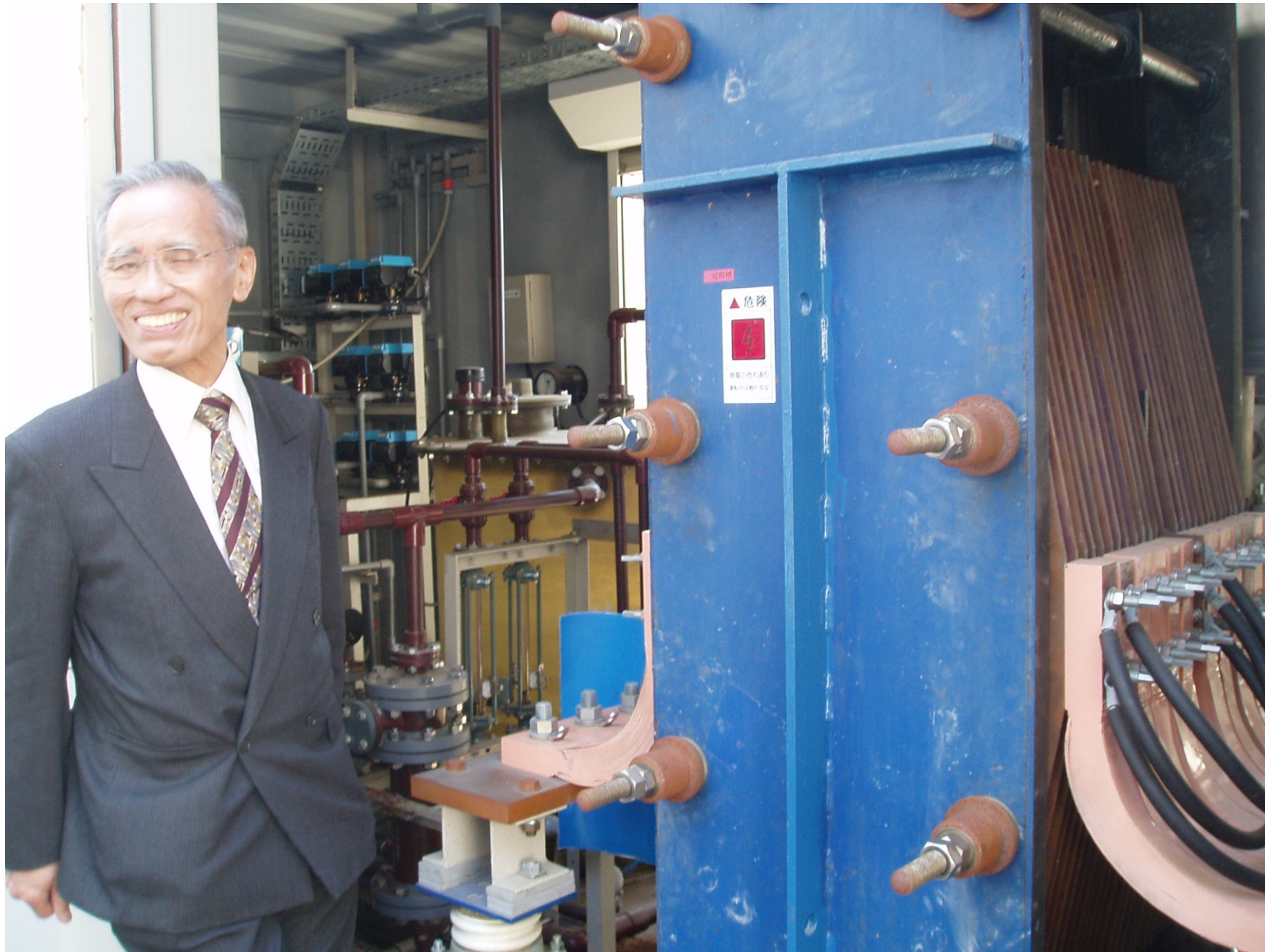
Electrical storage by the REDOX CO_2/CH_4 process

Prof. K. Hashimoto – SENDAI - Japon



Pilot process in Japon CH4 from CO2

- Electrochemical process(H2) and catalytic plug reactor (CH4)
- Key step :catalytic material:**ZrO2 stabilized by Sm with Ni sites on amorphous layer (540-580K)**
- $\text{CO}_2 + 2\text{H}_2 = \text{CH}_4 + 2\text{H}_2\text{O}$
- **Prof. K.Hashimoto Sendai University**



Professor K.Hashimoto Sendai University Japon

European Parliament STOA 22 /3/2011

EMRS/UPMC

