

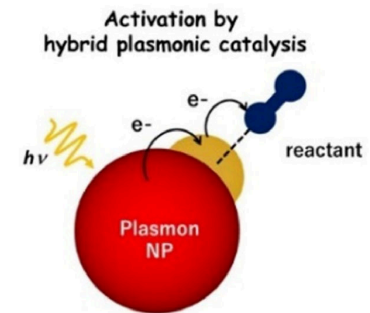
# Theme: **Development of catalytic reaction system for**

## Purpose: **CO<sub>2</sub> reduction and H<sub>2</sub> generation**

- (1) Reaction process engineering for the CO<sub>2</sub> reduction reaction
- (2) Utilization of the well-designed 3-D structured support for improved mass-transfer
- (3) Design of visible-NIR sensitive photocatalysts for H<sub>2</sub> generation reaction

## Achievement:

- (1) Preparation of highly dispersed catalysts and design of structured catalysts with intensified heat transferability to achieve superior CH<sub>4</sub> yield with higher selectivity.
- (2) Reaction process engineering to develop a low-cost CO<sub>2</sub> methanation catalytic system.
- (3) Fabrication of visible-NIR light-sensitive photocatalysts by tuning their plasmonic absorption.
- (4) Harnessing plasmonic nanostructures for their application in the enhanced H<sub>2</sub> evolution under solar light irradiation.



### Structured Catalyst System

**Chemical function** (reaction control)  
**Physical function** (high heat transfer, mass processing, rectified flow)

- Contact time
- Temperature
- Pressure drop
- Rectification

Vector control

- Operation ☉
- Performance ☉
- Efficiency ☉

