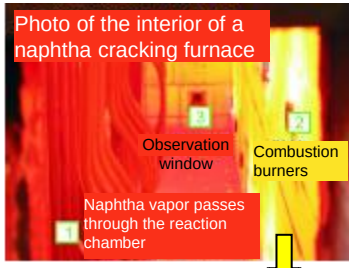
Development of Technology for Producing Raw Materials for Plastics Using CO_2 and Other Sources (Amount covered by the government: Up to 126.2 billion yen)

- Most of the raw materials for plastics are derived from naphtha (crude gasoline), which is obtained from refining petroleum, and **about half of the CO_2 emitted by the chemical industry** is due to **processes like cracking naphtha to produce basic chemicals such as ethylene and propylene**.
- In addition, about 84% of waste plastics are recycled, but **some 57% of these are used as a heat source for waste-to-energy plants, etc. (thermal recycling)**, and are **eventually discharged as CO_2**. So, drastic measures are therefore necessary.

[R&D Item 1]
Development of advanced technology for naphtha cracking furnaces by adopting carbon-free heat sources

- Currently, the heat source is off-gas (methane, etc.) generated from naphtha cracking furnaces.
- In this project, develop the world's first technology to **change** the heat source of naphtha cracking furnaces **to carbon-free sources(eg.ammonia)**.

[Aim to reduce CO_2 emissions by about 70%]



Change the heat source of furnaces that crack naphtha at about 850°C to ammonia

[R&D Item 2]
Development of technology for producing chemicals from waste plastics and rubber

- Establish **technology for producing raw materials such as ethylene and propylene from waste plastics and rubber**.
- Produce them at a yield ratio of 60 to 80%, and also aim to reduce the CO_2 emitted from the production process by about a half.

[Aim to reduce CO_2 emissions by about a half]

Waste plastic pyrolysis oil (Raw material for plastics)

[R&D Item 3]
Development of technology for producing functional chemicals from CO_2

- Functional chemicals such as polycarbonates theoretically be and polyurethanes can synthesized from CO_2 without requiring hydrogen.
- Work to **improve the functionality, such as electrical, optical, and mechanical properties**.

[Aim to turn CO_2 into raw materials]

High-performance polycarbonate (Camera lenses)

[R&D Item 4]
Development of technology for producing chemicals from alcohols
[Produced chemicals from green hydrogen and CO_2]

- Improve the catalyst yield (80-90%) for **producing olefins such as ethylene and propylene from methanol and other materials (MTO)**.
- Aim to commercialize artificial photosynthesis by **developing a photocatalyst capable of achieving both high conversion efficiency and mass productivity**.

MTO demonstration

Large-scale demonstration of photocatalytic panels