Ouchi Laboratory is engaged in the research and development of new smelting and recycling processes for nonferrous metals with an aim to achieve “Highly Efficient Use of Energy and Resource Recycling.” We contribute to the development of advanced technologies by efficiently converting energy into metal forms. We also contribute to the realization of a sustainable society by developing innovative recycling processes that actualize resource recycling.

**The 4 challenges of Ouchi Lab.**

Point 1: Development of processes with low-cost, efficient energy use, CO₂ reduction, and low environmental impact

Point 2: The introduction of renewable energy is promoted to achieve carbon neutrality. Highly efficient use of energy will become increasingly important.

Point 3: New processes that do not generate exhaust gases or waste liquids are needed.

Point 4: Energy conservation, CO₂ reduction, and low environmental impact must be achieved by promoting recycling.

### KEY RESEARCH TOPICS

**Precious metals (PMs)**

The gold and platinum group metals are key materials for advanced devices. We develop new processes to efficiently recover PMs from metal scraps using “Anodic deposition” though the anionic dissolution of PMs in molten salts and molten salt electrolysis.

**Reactive metals**

Lithium, sodium, calcium, magnesium, aluminum, zinc, and rare earth metals are used in energy materials, functional materials, and structural materials and reducing agents for metal production. We develop innovative smelting and refining processes by controlling electrochemical reactions in molten salts.

**Titanium**

Producing titanium metal from ore involves a specific multi-stage, energy-intensive, and high CO₂ emission process. To replace such a time-consuming and high-cost process, we develop new processes to efficiently remove oxygen from titanium scrap and enable “upgrade recycling” by producing purer titanium compared to that produced from the ore.

**Electrochemical plating**

For advanced devices, electrochemical plating is indispensable for fabricating wires and contacts, corrosion protection materials, functional components, catalysts, etc. We develop innovative plating technologies to produce structures and films with the desired functions and shapes by controlling the behavior of metal ions, electrode surface potential, and crystal structure.