Alloys containing rare metals. Our main focus is “future materials: titanium, rare metals”. We aim to innovate rare metal process technology for the betterment of society.

### Upgrade recycling of Ti

Titanium (Ti) scrap generated in the Ti ingot fabrication process is contaminated by oxygen impurities. Therefore, it is difficult to recycle Ti scraps into ingots.

#### Deoxidation of Ti using rare earth metals

Based on thermodynamic calculations, we have developed a novel deoxidation technology of directly removing oxygen from Ti scrap using rare earth metals such as yttrium (Y) and cerium (Ce).

#### Deoxidation of Ti via gas phase

We have developed a novel deoxidation technology for reducing the amount of deposits on Ti surface and impurities in Ti by supplying deoxidants and fluxes to Ti through the gas phase.

### Recycling of precious metals

Automotive catalysts contain 100–1000 times more PGMs than PGM ore. PCBs contain around 10 times more Au than Au ore.

#### Solubilization process

Technology to dissolve precious metals into solution, the process:

- requires strong chemicals
- generates a large amount of hazardous liquid waste
- consists of multiple steps

★ Environmental-friendly and highly efficient process is required.

#### Physical concentration process

Technology to selectively add functions (e.g., magnetism, hydrophobicity) to areas of scrap containing precious metals by electroless plating or chemical treatment with chloride or sulfide vapors, allowing for the concentration of precious metals using physical separation.