28th November 2014

Innovative System for the E-Scrap Treatment

at

Naoshima Smelter and Refinery

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for
Workshop 2014 of the Asian Network for Prevention of
Illegal Transboundary Movement of Hazardous Wastes

Copper Smelters of Mitsubishi Materials Corp.

Naoshima（E'Cu:20,000t/m）

1917	Establishmet
1974	**Commencement of 1st Mitsubishi Process**
1989	**Commencement of Precious Metal Process**
1991	**Commencement of Larger Mitsubishi Process**
2002	**Certificate the "Eco-Island Naoshima"**
2004	**Introduce the Incinerating Process**

Onahama（E'Cu:25,000t/m）

1963	Establishment
1965	Commission of #1 Reverberatory Furnace
1973	Commission of #2 Reverberatory Furnace
1980	**Treatment of used tire**
1993	**Treatment of the shredder dust**
2007	**Introduce the Mitsubishi S-Furnace**

General Flow of the Copper Smelter and Refinery

Raw Materials

Matte Production Flash Furnace

1250℃

Blister Making P.S.Converter

Mitsubishi Continuos Process

Differentiate

Anode Production

1200℃

Electrolytic Refining

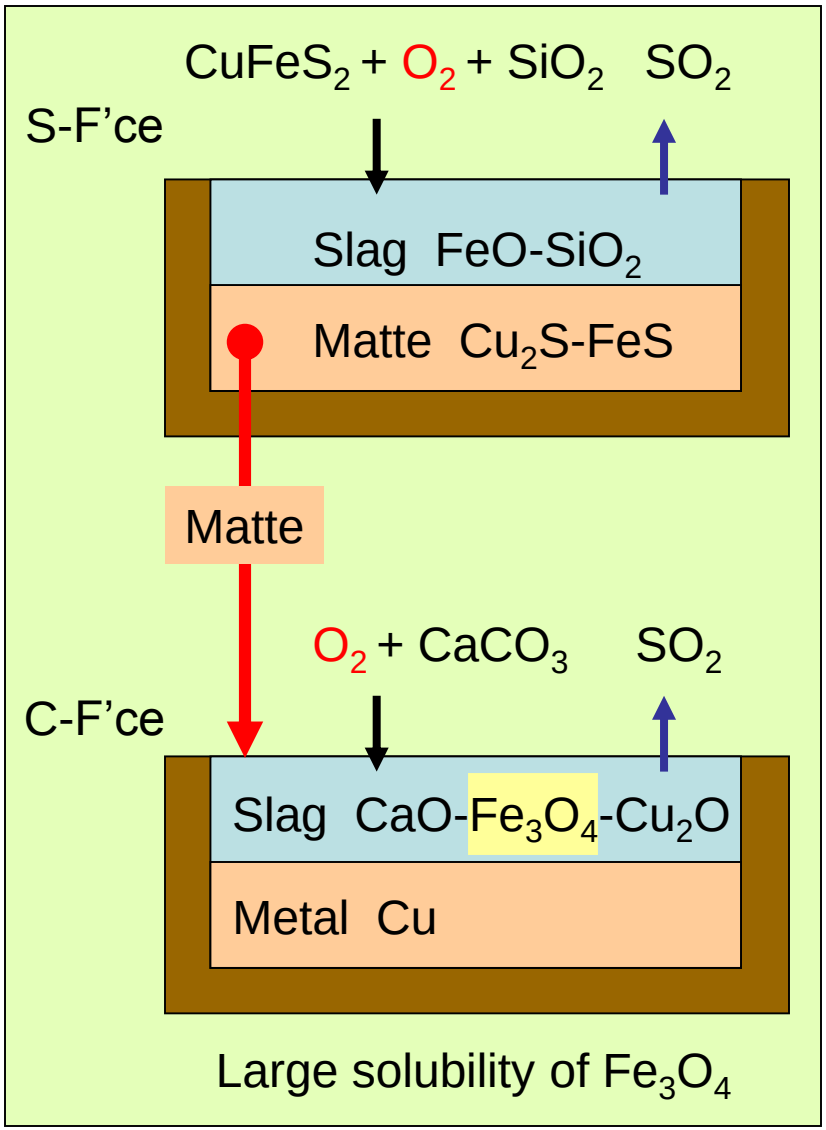
65℃

Electrolytic Copper

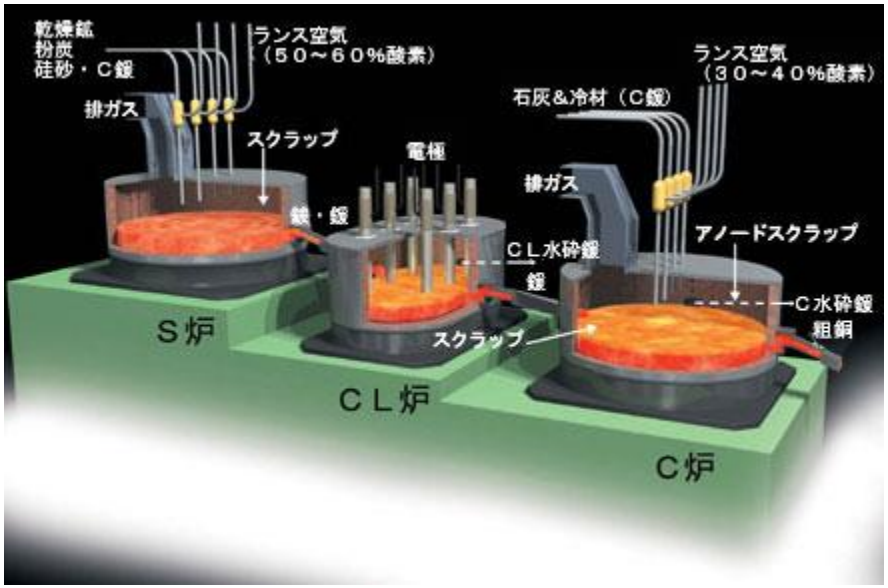
Slime

Precious Metal Process

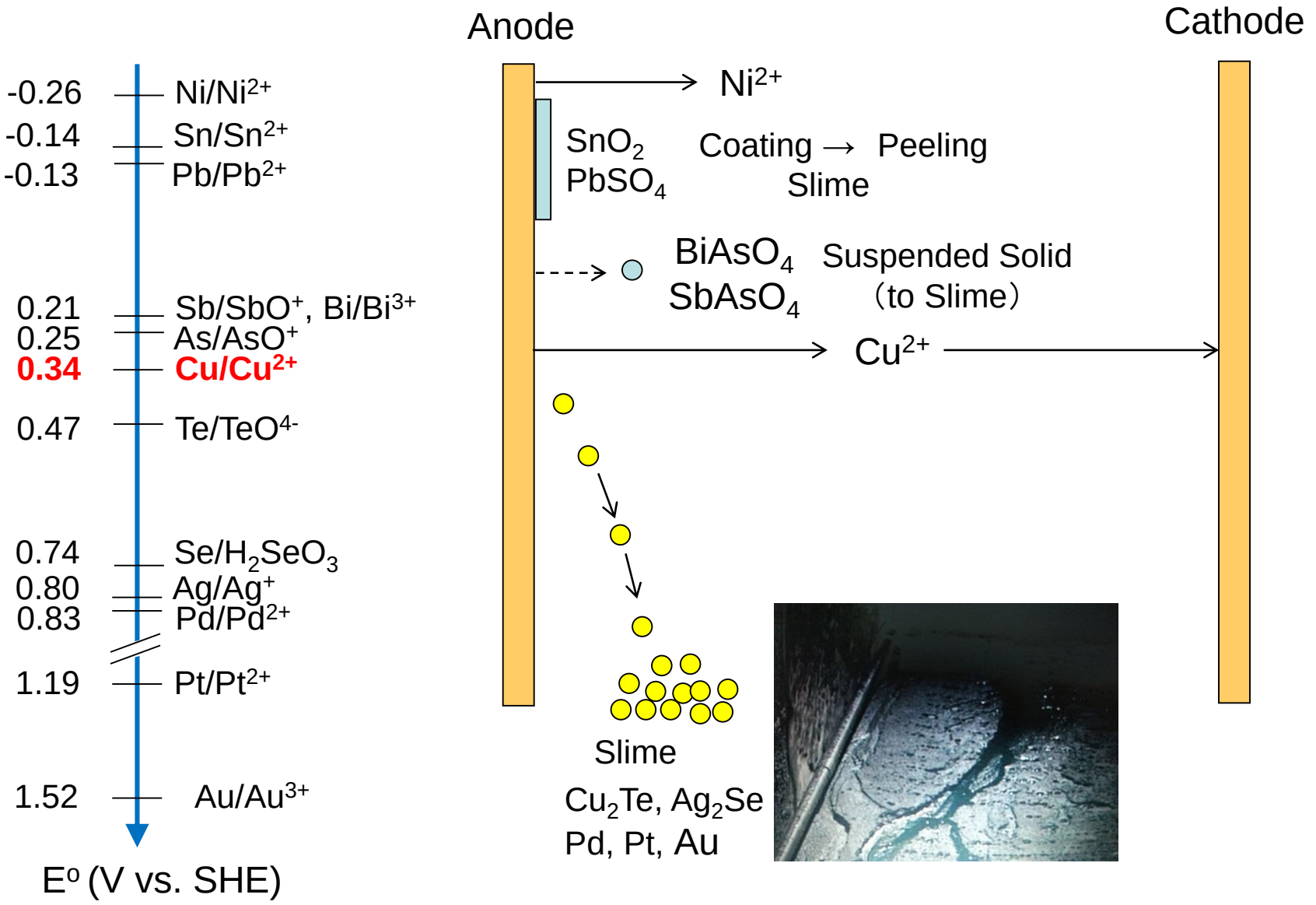
Mitsubishi Continuous Copper Smelting Process



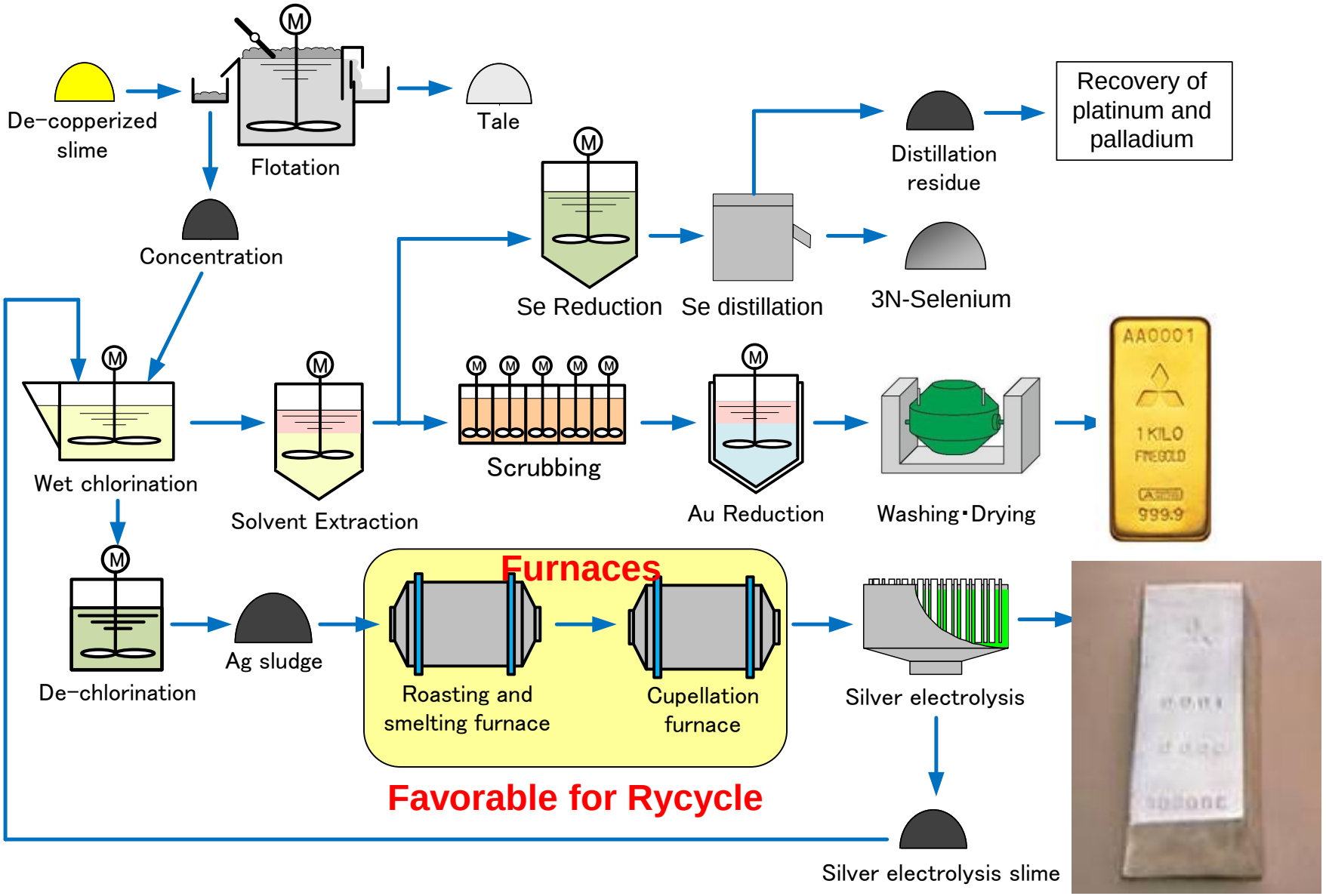
Chalcopyrite



Electrolytic Refining

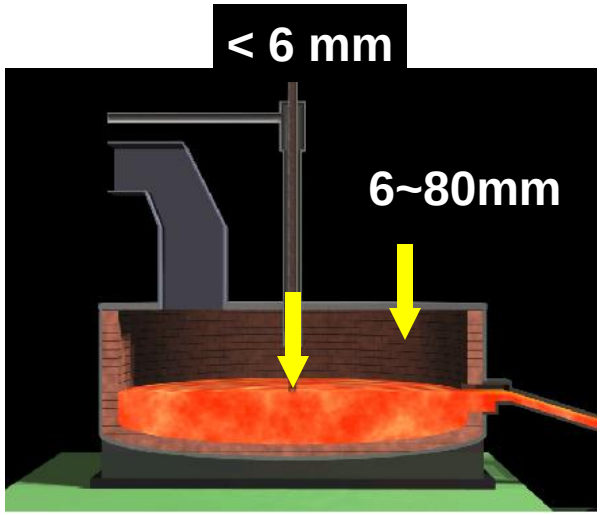


Precious Metals Process



Advantage of the Mitsubishi Process

1. Top Blowing Technology
   - ・High productivity
   - ・Chemical equilibrium condition
   - ・Very low copper loss

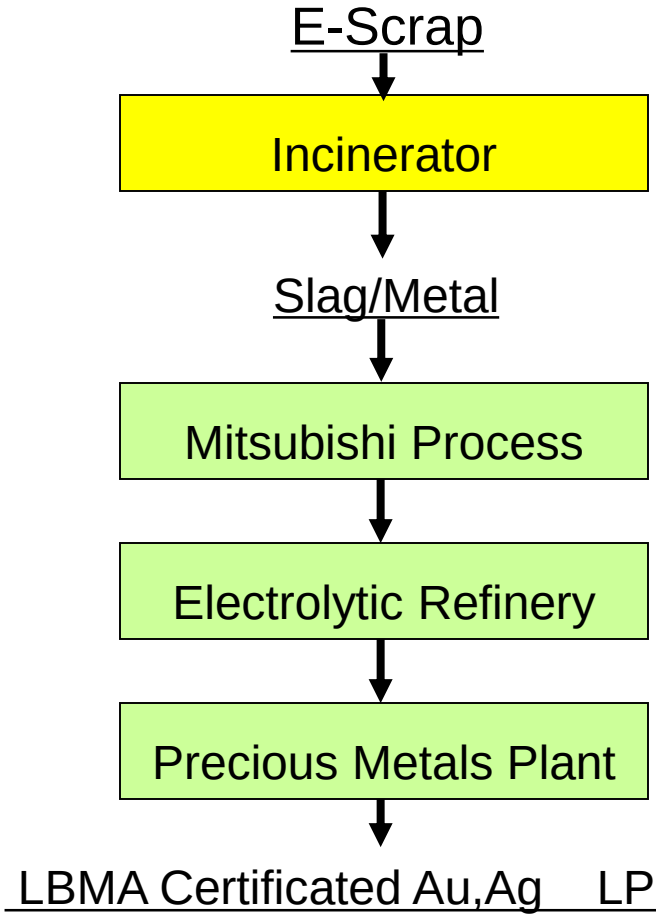


2. Lance and lumpy chute
   - ・Blowing air makes strong turbulence.
   - ・Vary shape of the scraps can be treated.

3. Continuous operation and closed melt launder.
   - ・Minimum fugitive gas
   - ・Sulfur recovery ratio is over than 99.99% !!

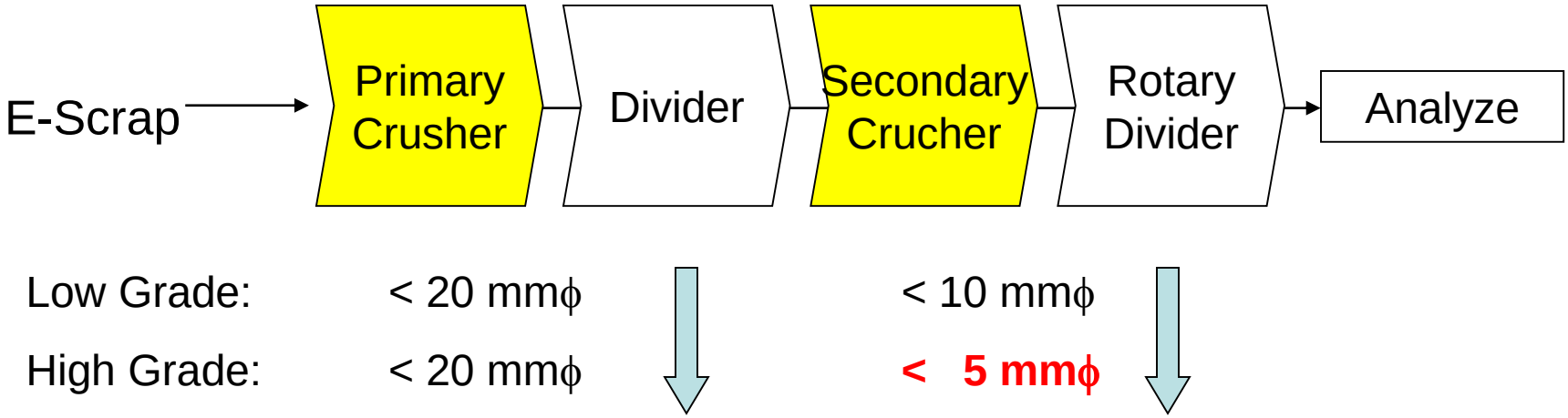
Combination of the Incinerator

- Effective usage of the melting capacity by reducing the E-Scrap volume.
- Continuous treatment of the Slag/Metal in the Mitsubishi Process.
- Minimize the metal loss by linkage treatment in the same plant area.



Incinerating Plant in Naoshima

Customer Satisfaction – high reliability sampling



E-Scraps

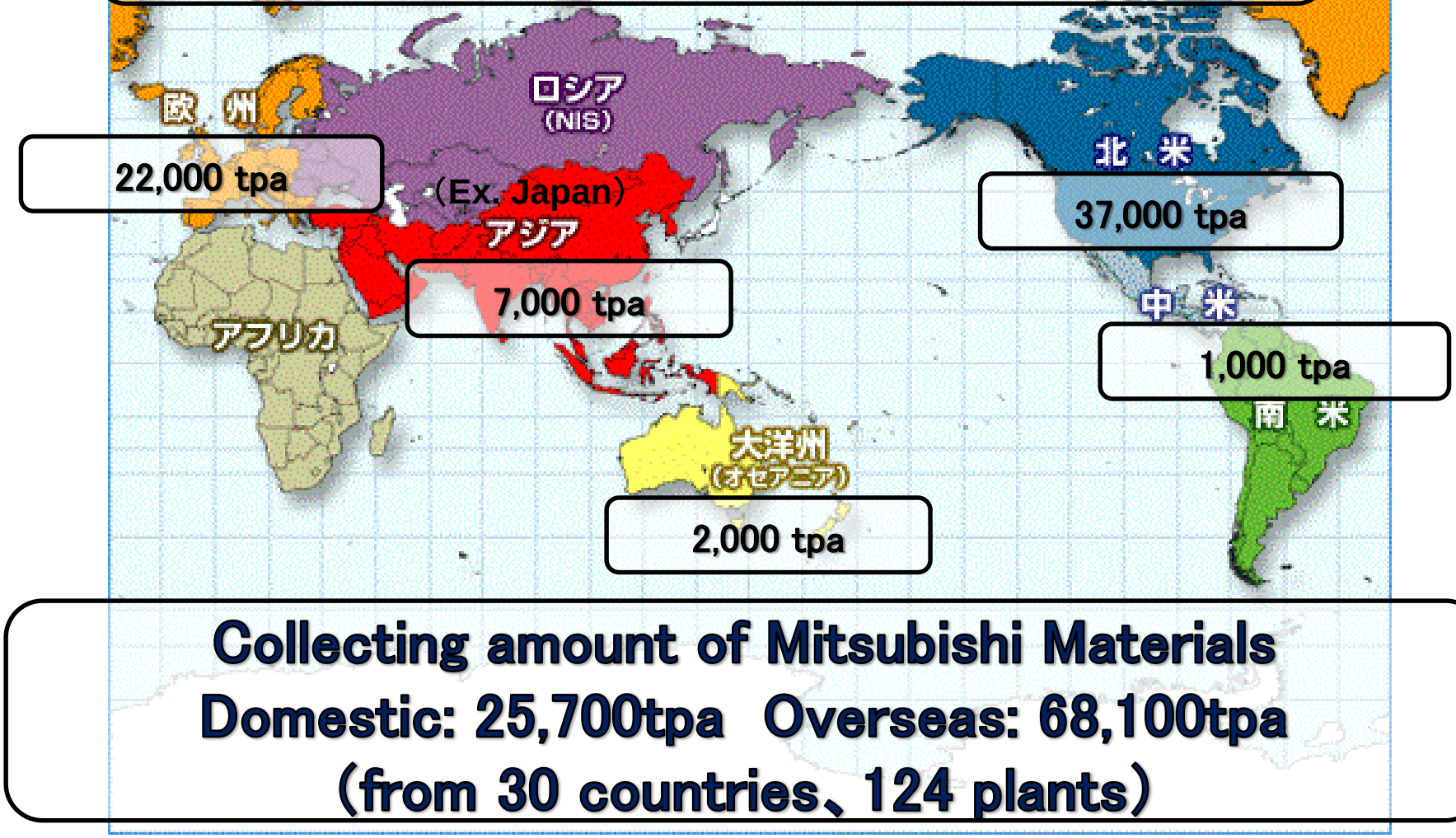
Primary Crusher

Secondary Crusher

E-Scrap from all over the World

World E-Scrap Demand

Domestic: 84,000tpa　Overseas: 455,000tpa



Collecting amount of Mitsubishi Materials

Domestic: 25,700tpa　Overseas: 68,100tpa

（from 30 countries、124 plants）

Conclusion - Conviction of the E-Scrap Business Global Player

Mitsubishi Materials Corporation established strong E-Scrap treatment business with environmental friendly process.

- Zero Emission
  - Recover the metals / precious metals under the low metal loss.
  - All of the materials are fixed into the product.
  - Keep the strict environmental regulation in Japan.
- Advanced Technology
  - High efficiency treatment at the Mitsubishi Process
  - Combination of the Incinerator and the Mitsubishi Process
- Customer Satisfaction
  - Established the high reliability sampling technology.
  - Developed the automatic sample preparation for the assay.
  - Minimize the environmental impact by the Mitsubishi Process.