

# MAEDA LAB.

## [Refinement of Silicon for Solar Cells and Recycling of Rare Metals]

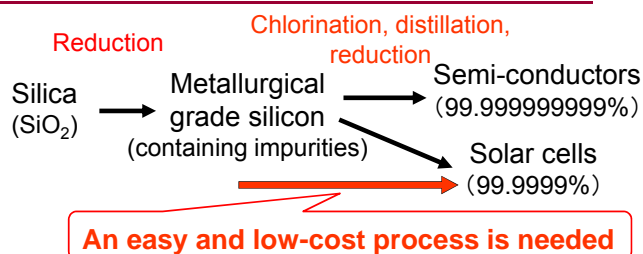
International Research Center for Sustainable Materials

<http://maedam.iis.u-tokyo.ac.jp>

Department  
of Materials  
Engineering

### Resource Recovery and Waste Technology

## Refinement of Silicon for Solar Cells



- ◆ Study on evaporation mechanism of impurities from silicon by Knudsen mass spectrometry

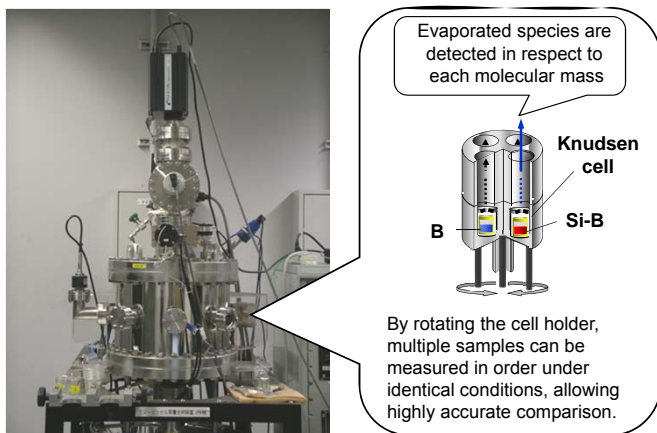


Fig. Equipment for Double Knudsen mass spectrometry

- ◆ Removal of impurities (P and B) from silicon by electron beam melting under vacuum.

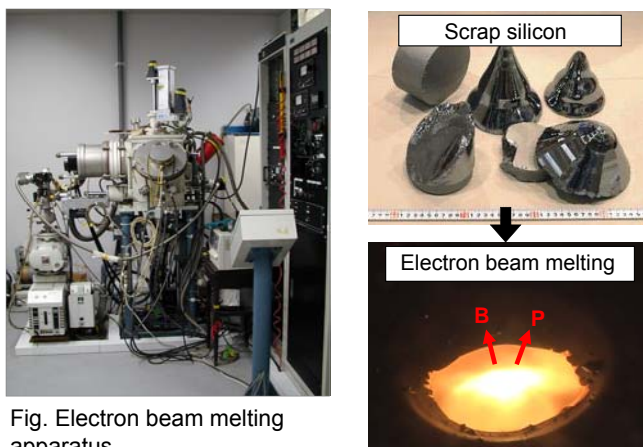


Fig. Electron beam melting apparatus

## Recycling of Rare Metals

- ◆ Recovery of precious metals used in automotive catalysts

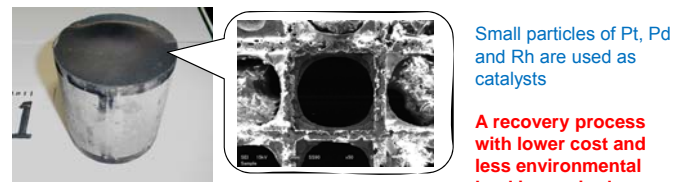


Fig. Spent catalyst and its SEM image

### Development of a means to enhance dissolution by Zn vapor treatment.

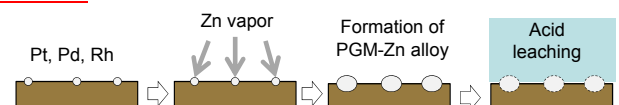


Fig. Recovery process proposed by this study

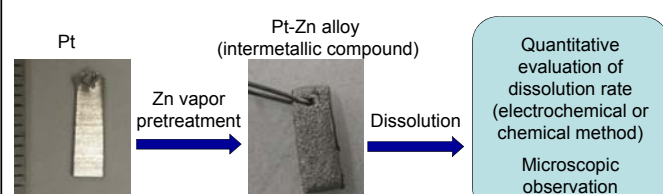


Fig. Fundamental research on formation and dissolution of PGM-Zn alloys

- ◆ Recovery of rare earth metals (REM)  
Thermodynamic information (vapor pressure, affinity, etc..) is needed for metal separation, recovery and refinement.  
→ Thermodynamic measurement of Fe-REM alloys
- ◆ Thermodynamic investigation of slag  
Thermodynamic properties of slag such as  $\text{CaO-P}_2\text{O}_5$  oxide systems were studied.

## Other topics

- ◆ Drying process of brown coals
- ◆ Novel process for reduction of  $\text{SiO}_2$

### Members

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