

Integrated Research Center for Sustainable Energy and Materials

[Materials and Energy for Future Generations]

Established in April 2016 for a five-year period.

Director: Toru H. OKABE

<http://susmat.iis.u-tokyo.ac.jp/english/about.html>

Integration of materials engineering and energy engineering for realizing a sustainable society

This center was established in April 2016 to propose tactics to achieve the goal of a sustainable society in terms of “energy and materials”. This center collaborates closely with companies and endowed research units, such as the Endowed Research Unit for Non-Ferrous Metal Resource Recovery Engineering (JX Metals Endowed Unit), in Japan as well as abroad in order to conduct research on the following topics in the field of metal, inorganic, and organic materials:

- Developing processes to efficiently utilize energy and resources.
- Inspecting the recycling processes of industrially important materials and their byproducts.
- Developing materials production processes and the corresponding disposal processes.
- Developing new materials and systems with low environmental loads.

Director



T. H. Okabe,
Prof.

Deputy Director



N. Yoshie,
Prof.



H. Inoue,
Prof.



K. Edagawa,
Prof.



N. Shikazono,
Prof.



T. Yoshikawa
Associate Prof.



S. Yagi,
Associate Prof.



S. Owada,
Visiting Prof.



K. Yamaguchi,
Visiting Prof.



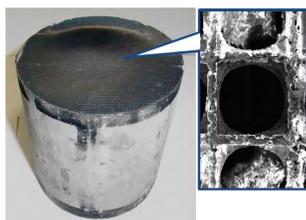
A. Shibayama,
Visiting Prof.

Research topics

Resources / Materials Recycling Unit:

– Design of Resources/Substances/Materials Flow and Process Control –

- Process development based on international material flow
- Analysis of generation, immobilization, and recycling of hazardous substances
- Development of recycling processes for exhaustible resources
- Improvement of production technologies for base materials
- Development of highly-efficient electrolytic smelting processes



Recovery of PGMs
from automobile scraps

Energy / Resource Efficient Utilization Unit:

– Base Engineering for a Low Energy Consumption Society –

- Solution growth of eco-semiconductor SiC and AlN using alloy solvent
- Determining of economic indicators for energy and materials market
- Improvement of power density and reliability of solid oxide fuel cell
- Development of novel heat technologies for heat engines and heat pumps



Direct observation of high-temp.
interface during crystal growth

Advanced Substances / Materials Design Unit:

– Material Engineering for Maximized Utilization of Resources/Substances –

- Design and fabrication of polymers and glasses with a reduced environmental load
- Development of chemical technologies for biomass utilization
- Mechanical properties of environmentally sound materials
- Development of novel high-efficiency thermoelectric materials

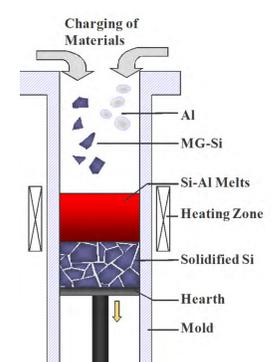


Melting of simulated waste
borosilicate glass

Establishment of Social Implementation Promotion Unit:

– Strong Cooperation with Industry –

- Development of ultra-long-life materials
- Atomic-scale optimization for prolonging materials lifetime
- Optimization of waste treatment of huge amounts of structural materials
- Establishment of recycling technology for socially valuable materials



Solidification refining process
for solar-grade Si