

# JX Metals' Approach

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Shigeru Oi  
Co-chair

**Not only reinforcing the Tailings Dam,  
but also reviving the Nature**

Fujigaya, Japan: Tailings dam site improvement

# SDGs/ESG Commitment by JX

## -through its membership in international organizations

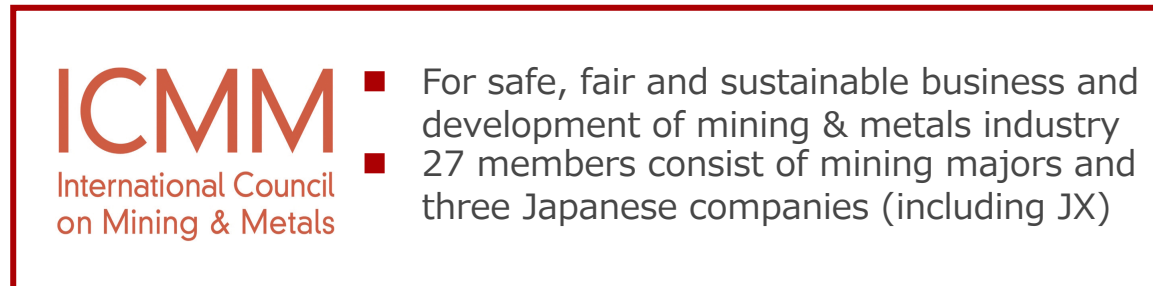
As a member, JX is supporting the important initiatives towards SDGs/ESG as follows:

### ■ WMF

- Adopting **WMF KPIs** as advanced metrics to achieve the SDGs

### ■ ICMM

- **Performance Expectations (“Pes”)**
  - ➡ Defining members’ ESG requirements and validating and assuring their performance
- **Global Industry Standard on Tailings Management** (launched on 5 August, 2020)
  - ➡ Integrating ESG and technical considerations for tailings management





# JX Long-Term Vision 2040

As a **technology-based company** in order to respond to the **innovation**, to **contribute to the sustainable society** which **the SDGs** aim for.

Redefine  
the role of  
each business

Develop and  
strengthen  
new businesses

HR Development  
who could create  
new value



**Focus Business** Core of Growth



**Base Business** Corporate Foundation

Development by  
Open innovation

Transformation of  
organization

# ESG Management by all businesses, to contribute to SDGs

## All JX's Businesses



### Base Business

Source of Materials and Core-Technologies  
-Mineral Resources, Smelting & Refining, Recycling

Strong Support



### Focus Business

Stable supply of Advanced Materials  
-Electronic materials and others(see later page)

## Contribution to SDGs

Especially we have two remarkable points;

- Supply of Advanced Materials with continuous innovation
- Recycling for Circular Economy



Plant with less emission and environmental impacts "Saganoseki Smelter"



Detoxification of Industrial waste  
(Asbestos Detoxification)



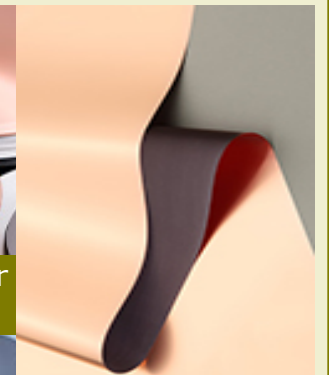
Recycling



Sputtering Targets for Semiconductor



Indium-Phosphorus single crystal wafer  
(for optical signal)



Very thin (5μm) Treated-Rolled Copper foil (for FPC)



# Example of the increased demand for Advanced Materials in Smartphone



Number of metal parts inside smartphone :  
➡ roughly **One Thousand ++**

# JX: Supplying Advanced Materials to the “Digital Age”



Sputtering Target  
for Semiconductor



Compound  
Semiconductor



Tantalum Powder

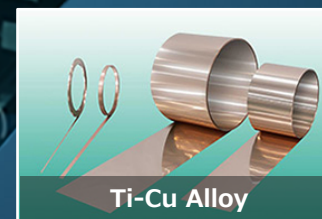


Mfg by Material Concept

Copper Paste for  
Semiconductor



Corson Alloy



Ti-Cu Alloy



Treated Rolled  
Copper Foil



High-purity Copper



Indium-Tin-Oxide  
Target

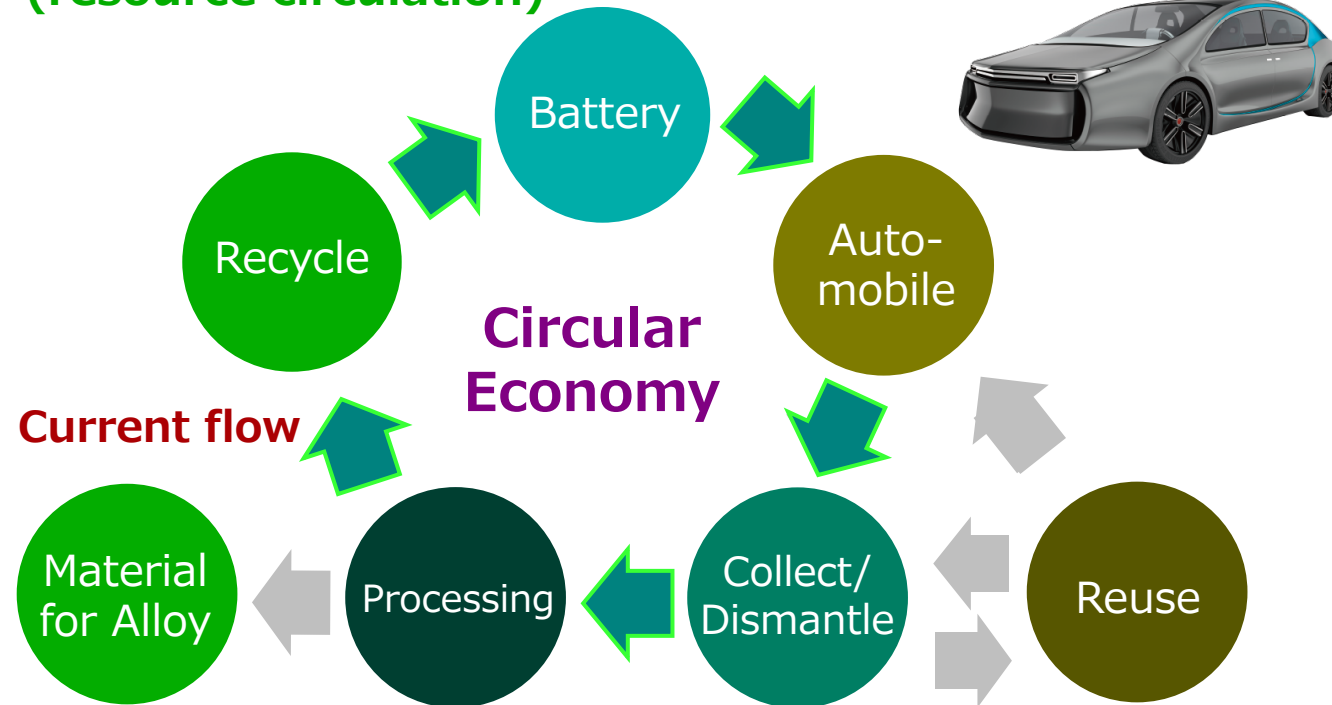
Number of parts which use  
“JX materials inside” :  
➡ One hundred ++



# JX: Recycling the Critical Materials

## - Sound recycling system of LiB

Closed loop recycling  
(resource circulation)



High quality materials supplied from the above process will increase the percentage of recycled materials in manufacturing new EV-LiBs.

### ■ JX's EV-LiB Recycling

- Recycle 2nd life to **80%** of used EV batteries by 2030
- Target for recycling rate by 2040  
**Co:90% Ni:90% Li:70% Mn:40-50%**



EV-LiB Recycling Bench-scale equip.  
(Hitachi City, Operation started Feb, 2020)

Manufactured by this equipment



# To achieve Long-term Vision

## 1. As a Technology-based company: Development by Open innovation



Partnership with  
Start-Ups

Personnel  
Exchange

- Copper-paste with **Material Concept** [Tohoku Univ. originated]
- 3D Additive manufacturing("AM") powder with **OxMet Technologies** [Oxford Univ. originated]
- Gallium oxide for Power devices with **Novel Crystal Technology**
- Lotus Metal (porous shape) with **Lotus Thermal Solution**
- Accelerator Program in Europe: Open call for New business ideas

.....etc.



JX

Mfg by Material Concept



Copper Paste



Copper Powder for AM



Shape by AM method  
(Tantalum)

Personnel  
Exchange



Partnership with  
Academia

- **Tokyo Univ.**
    - Resource circulation, Outreach activity
  - **Tohoku Univ.**
    - Cutting edge technology, HR development
  - **Kyoto Univ.**
    - SDGs, HR development
  - **Tokyo Institute of Technology**
    - Cutting edge technology
  - **Advanced Industrial Science and Technology**
    - Cutting edge technology
- .....etc.



# To achieve Long-term Vision

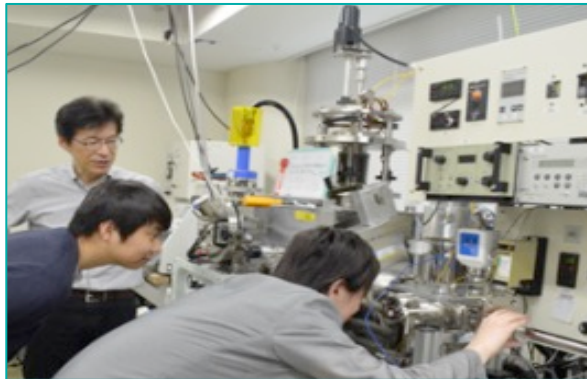
## 2. HR Development: Not only for JX staff, but for Metals industry's bottom-up

### HR Development for JX staff (example)

- In-house program for Data-scientists
  - Recruit by the partnership with Univ.
  - Step-by-step in house training
- Exchanging personnel with Academia

### Outreach activities for whole Metals industry

- University classes, Lectures for business persons (see below left picture)
- Events for the Youth (see below right picture)
  - Open campus at Tokyo Univ.
  - Kids plant tours
  - Visiting lectures for Junior-high students



Exchanging engineers and technical discussions with Tohoku Univ.



JX Donated **Material Innovation Centre** to Tohoku Univ.



"SDGs and Non-Ferrous Metals Industry" (Waseda Univ. 23/Dec/2019)



Open Campus for Junior-High Students (Tokyo Univ.)





