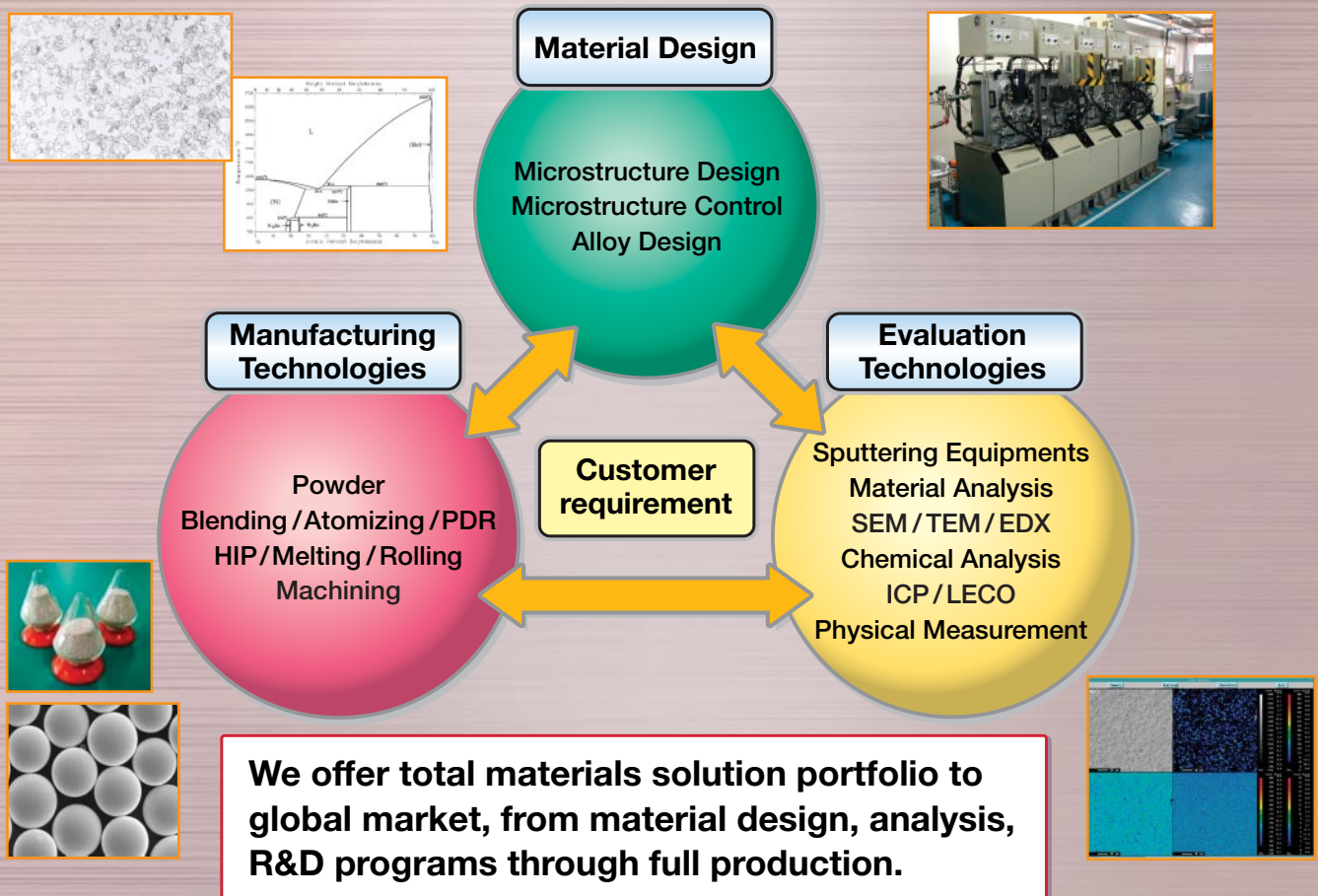


Hitachi Metals Target Materials

Material development of Hitachi Metals



Line up

Field	Composition	Usage
Flat Panel	Mo, Mo alloy, Ag alloy, Cu alloy, Ni alloy	LCD, PDP, OLED
Magnetic Recording	SUL, Co alloy, Ni alloy, Cr alloy	PMR, LMR, R-W Head
Energy	Mo, Mo alloy, Ni alloy, Ag alloy	Solar Cell
Semiconductor IC	Ti-W, W, Silicide	Bump, Memory
Hard coating	Cr, Cr alloy, Ti alloy, Al alloy	Tool, Automotive parts

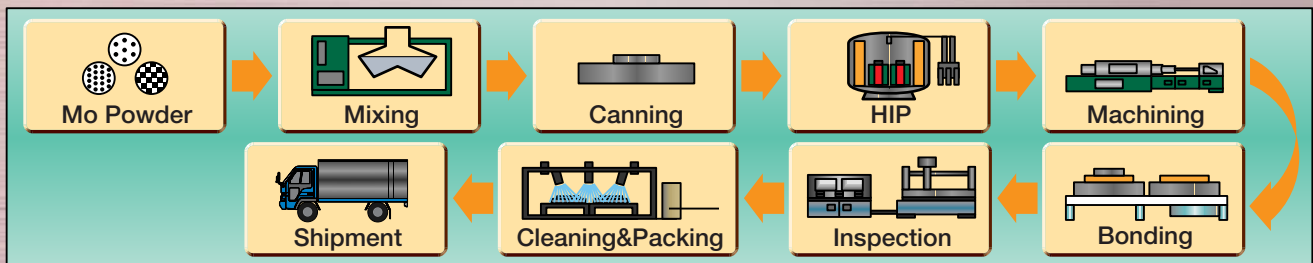
In addition to materials above, we offer variety of solid-metals or alloys for your business.
Feel free to contact for your materials request.

Mo Target Material for Back Electrode of CIGS Solar Cell

Point

- Proven HIP “powder sintering” process realizes fine and homogeneous Mo target.
- With using homogeneous Mo target, high-efficiency of energy conversion is achieved in the cells.

Manufacturing process of Hitachi Metals' Mo targets



Microstructure comparison table between HIP process and Rolling process

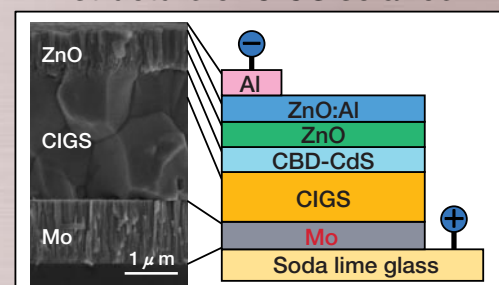
	Plane	Section
HIP process Mo target		
Rolling process Mo target		

CIGS thin film solar cell by using Hitachi Metals HIP Mo target

Resistivity and sheet resistance of Mo back contact, and CIGS solar cell performance.

ρ ($\mu \Omega \text{ cm}$)	R_{\square} (Ω / \square)	V_{oc} (V)	J_{sc} (mA/cm^2)	FF	η_{total} (%)
24.5	0.24	0.683	35.5	0.773	18.7

A structure of CIGS solar cell



* Collaborate with Aoyama Gakuin University in joint research

Ni-alloy Target Material for Electrode of Thin Film Solar Cell

Point

- Non magnetization
- Low resistivity
- Low reflectance

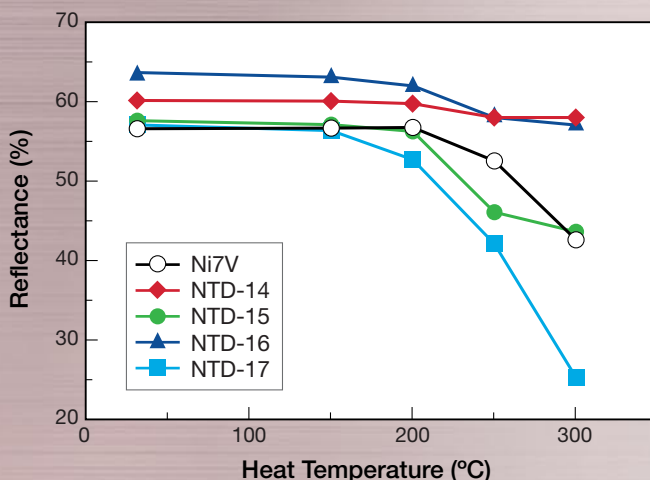
Characteristics of Ni alloy films

Materials Property	Cr	Mo	Ni7V	NTD-14	NTD-15	NTD-16	NTD-17
Magnetization	Non	Non	Non	Non	Non	Non	A few
Sputtering Rate (nm/sec)	0.57	0.57	0.56	0.53	0.51	0.55	0.51
Resistivity ($\mu \Omega$ cm)	22	14	67	56	54	60	44
Wet Etching (by Al Etchant)	×	○	×	○	×	×	○

Target size: ϕ 100mm, Power: 500W, Ar pressure: 0.5Pa Thickness: 200nm

- Resistivity : NTD < Ni7V
- NTD-14 and 17 can be etched with Al etchant

Reflectance after annealing



Compared with Ni7V
NTD-14,16: High heatproof
NTD-17: Low reflectance
(After annealing in air)