

Nb From OTIC



宁夏东方钽业股份有限公司
NINGXIA ORIENT TANTALUM INDUSTRY CO.,LTD.



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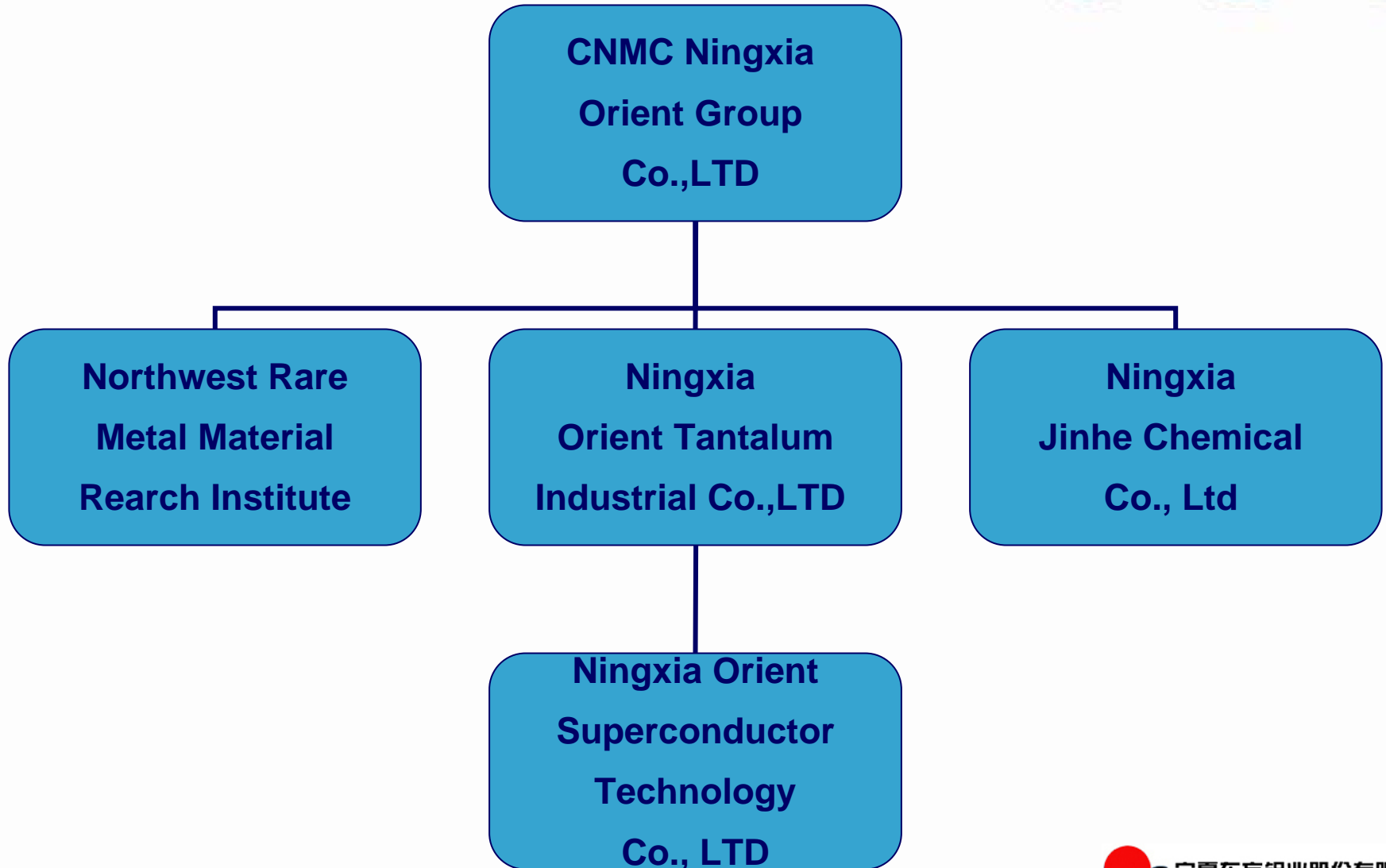
Location of OTIC



Location of OTIC



General Introduction of OTIC



General Introduction of CNMNC



❖ CNMNC

- Capital: 746 Million RMB
- Employee: 5737

❖ OTIC

- Capital: 353 Million RMB
- Employee: 2417



❖ Main Product

- Tantalum Powder >200T / Y
- Tantalum Wire 80T / Y
- Ta/Nb plate & tube & welding product for CPI, capacitor industrial and furnace components
- Ta alloy product
- Nb alloy product
- Titanium
- BeCu alloy

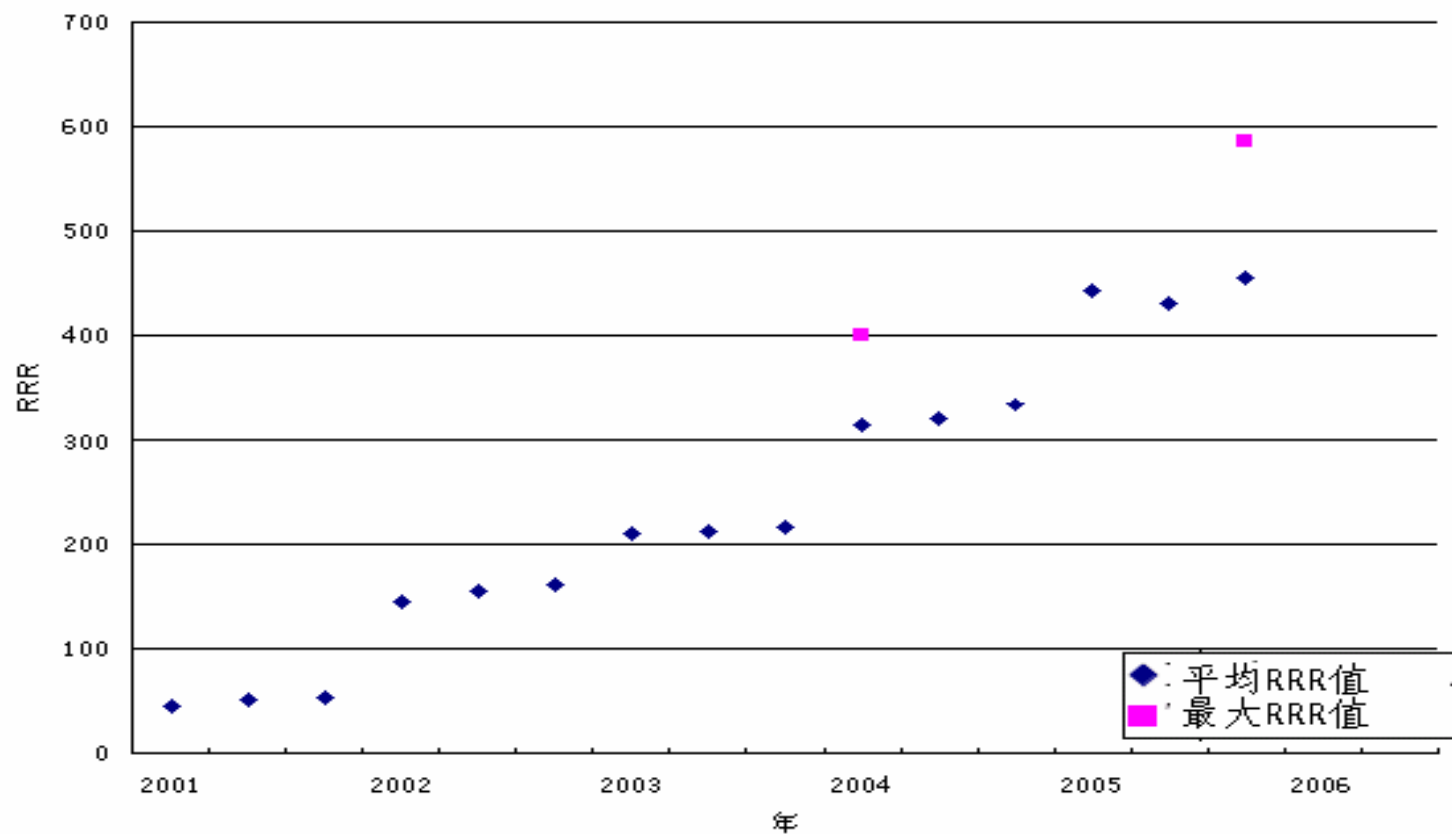


❖ **The Factory was founded in 1968, and the Nb was produced since then.**

❖ **Nb products:**

- ingot
- billet
- sheet
- tube
- wire
- welded products

high RRR Nb in OTIC



high RRR Nb in OTIC



High RRR Nb ingot



High RRR Nb sheet

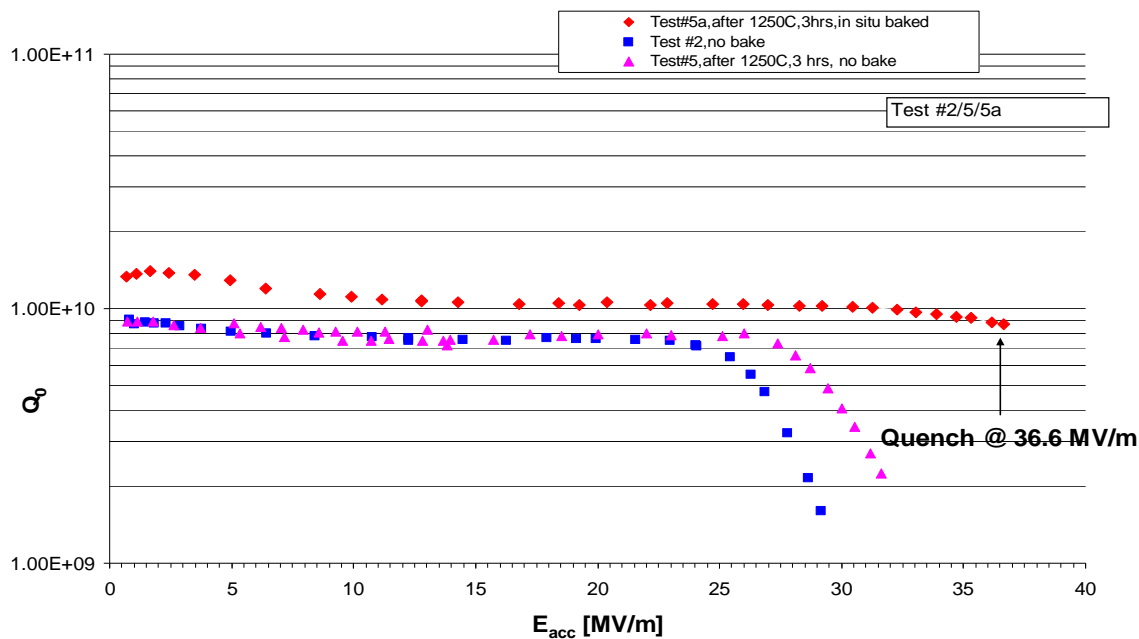
high RRR Nb in OTIC



Large grain Nb



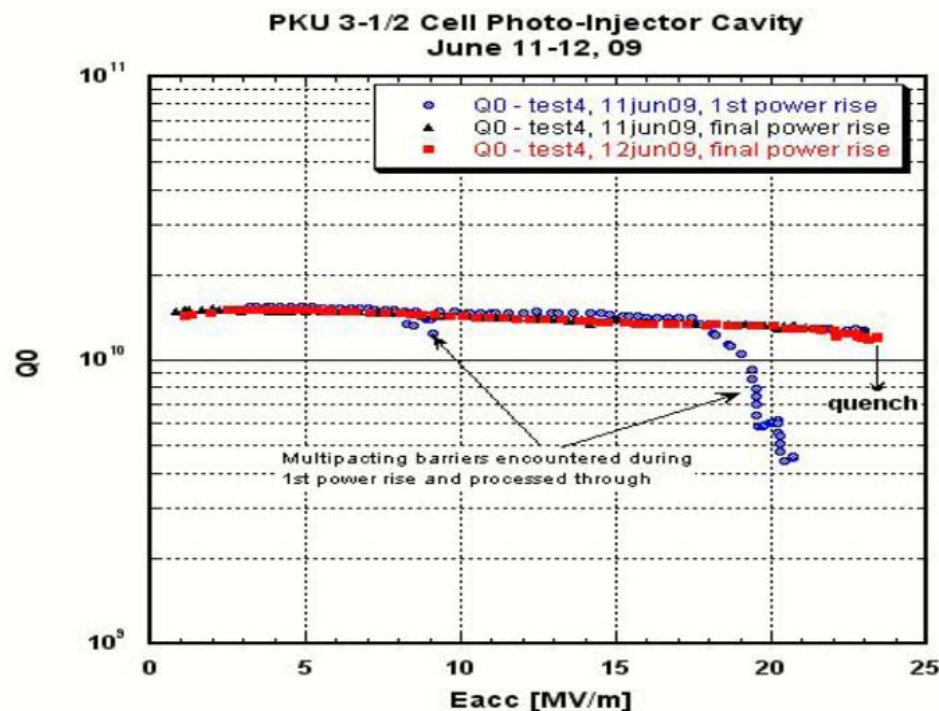
CEBAF Single cell Chinese Large Grain
 Q_0 vs. E_{acc}



high RRR Nb in OTIC



A 3.5cell large grain cavity made by PKU were operated at a gradient 23.5MV/m in 2009.

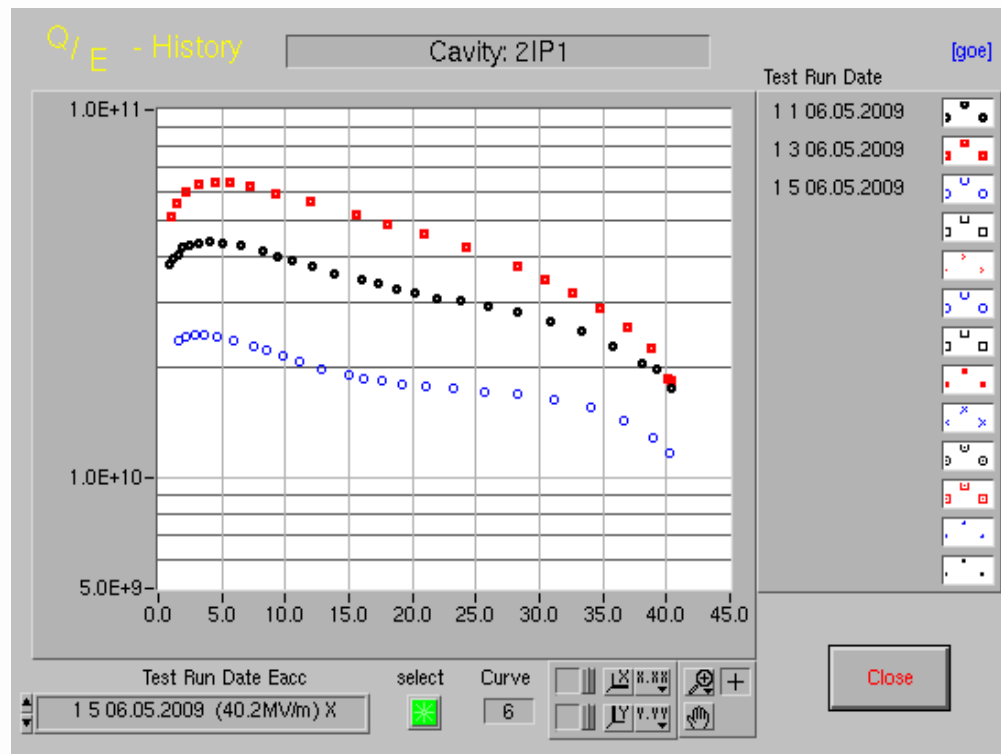


tested by JLab



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high RRR Nb in OTIC



Conclusions:

- No Q disease.
- $E=40.2$ MV/m, $Q=1.2 \cdot 10^{10}$, BD, no FE after MP processing in 1st Pi mode run at 1.8 K.
- Q versus T done up to 1.5 K. Residual resistance of Nb material was $4E-9$ Ohm.
- MM: both modes limited by BD, at 40 and 44 MV/m, without FE.
- Very good cavity made of a good Nb material.
- China may be a next producer of good superconducting cavities.

Krzysztof Twarowski

tested by DESY

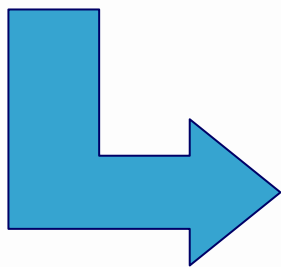
Equipments

Liquid-to-liquid Process



Ore → Nb₂O₅

Equipments



Nb





600kw EB furnace



$\text{Nb} \rightarrow \text{Nb(RRR)}$

Advantages



❖ Hydrometallurgy

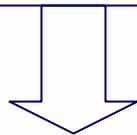
- limit Ta,W,Mo

❖ Aluminium Thermal Reduction

- limit C

❖ 600kw EB furnace remelting

- limit O,N,H
- limit low meltpoint element



Nb(RRR)

Equipments



**Forge
machine**



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Vaccum furnace



Ta heater

$\sim 10^{-4}\text{Pa}$

$\sim 1400^{\circ}\text{C}$



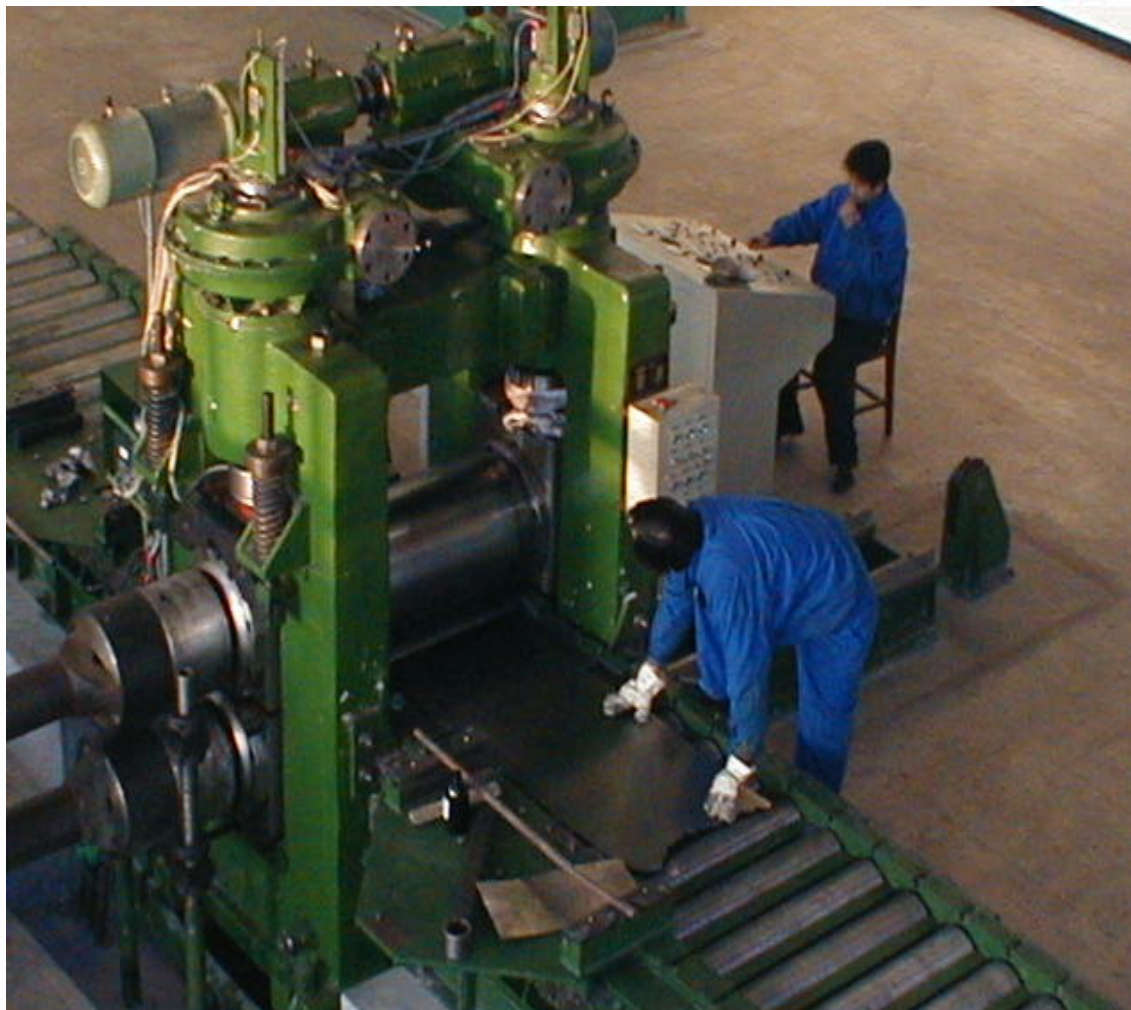
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Equipments



$\Phi 1000 \times 1250$ 2 Rollers Rolling Mill

Equipments



$\Phi 450 \times 800$ 2 Rollers Rolling
mill

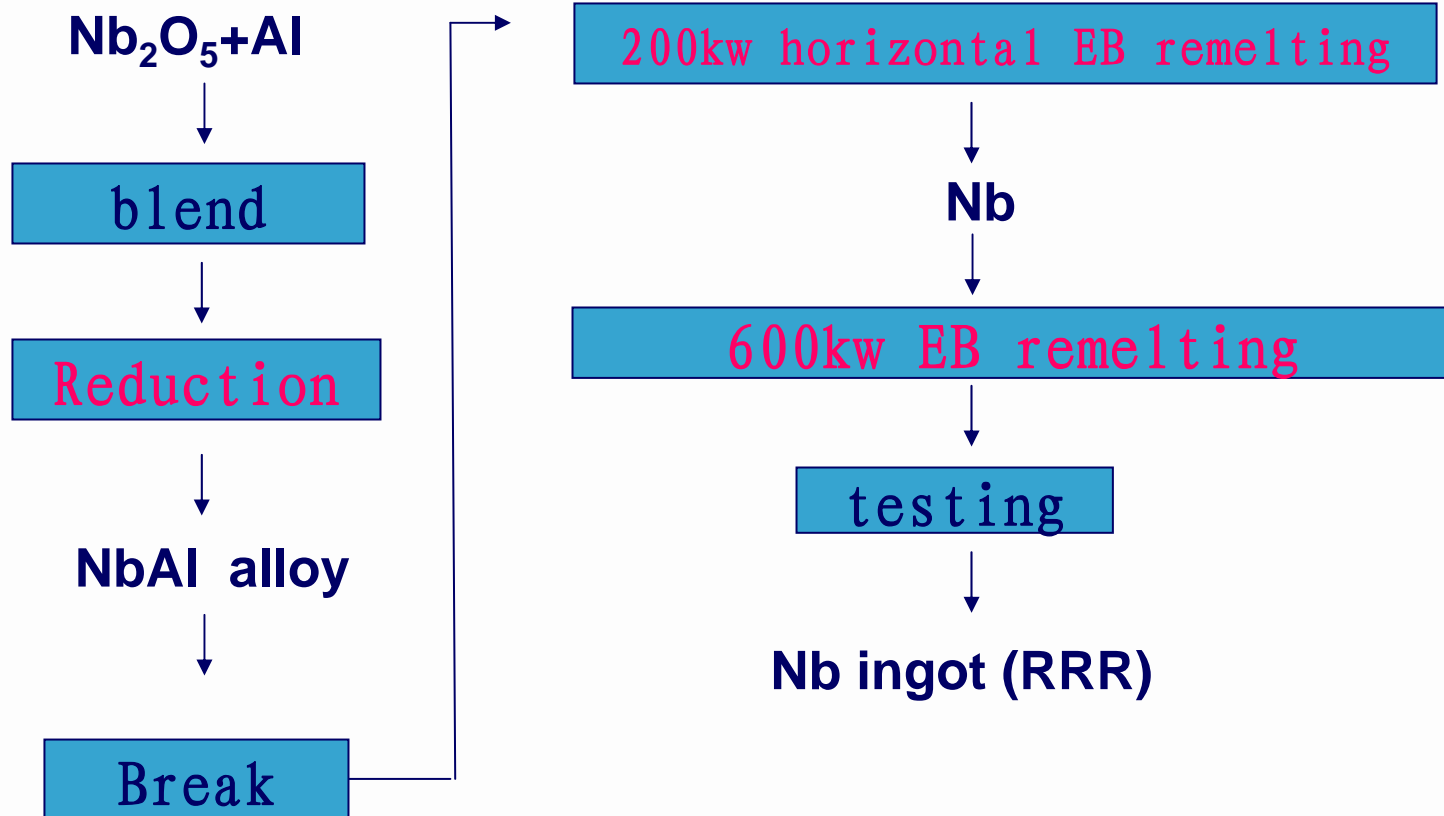
Equipments



$\Phi 230/\Phi 550 \times 800$ 4 Rollers Rolling Mill



Nb ingot





Nb55Ti ingot

Nb + Ti



Electrode

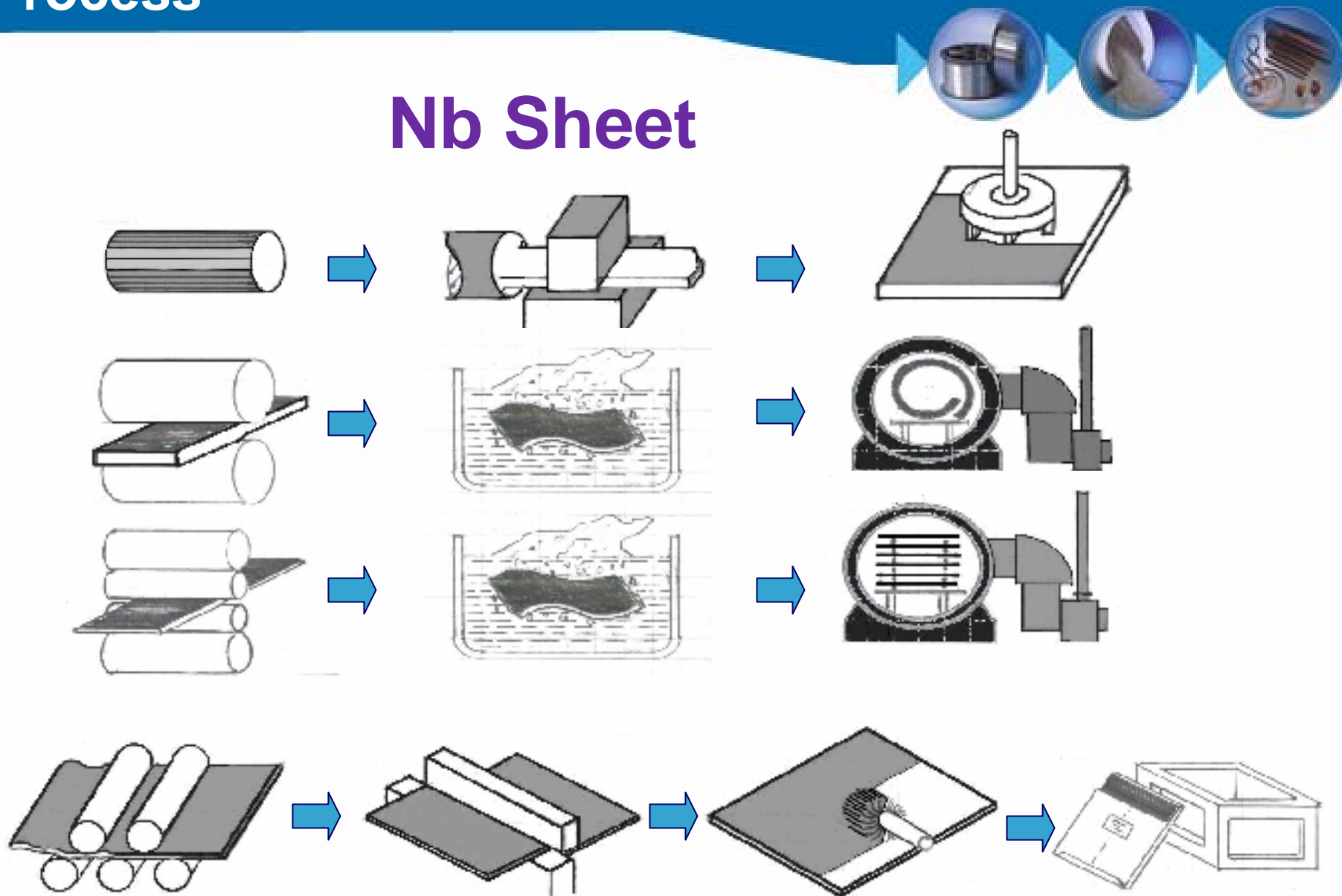


VAR



**Nb55Ti
ingot**

Nb Sheet





Nb Tube

Ingots

drill hole

forge

turning

chemical polish

testing

Tube (RRR)



Nb tube (RRR)

Material for Europe FEL



No.	Material	Parts	Demension (mm)	amount
1	RRR300	Nb sheet	265x265x2.8	2943
2	Nb55%Ti	NbTi Ring	OD220xID100 xT5	1366
3	RRR 40	Nb sheet	1100X342X2	55
4	RRR 300	Nb sheet	360x305x9	22
5	RRR 40	Nb Ring	OD135xID75xT27	683
6	Nb55%Ti	NbTi bar	DIA142xL1000	3690



❖ **Mechanical property analysis**

❖ **Chemical analysis**

❖ **Surface check**

❖ **RRR measurement**

Certificate of management



Production Capacity



❖ **RRR300 Nb sheet 20T / Y max**

- For ILC demand, it may meet 20% and finish it in 6 Years.

❖ **Nb55Ti flange 50T / Y**

❖ **Ti pipes and flange 500T / Y**



❖ Ningxia orient superconductor technology Co.,Ltd

- Cavity fabrication

❖ Development and improve

- Disk
 - Deep drawing
 - Welding
- Tube
- Rod
- Coupler housing and F part
- Quality improve

Thank You !