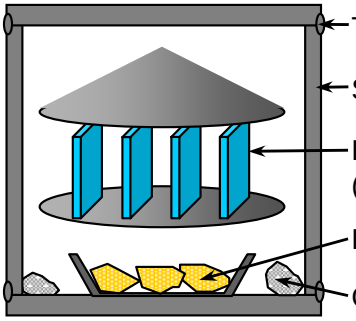
New Titanium Production Process (PRP)

Conversion of Ti into Common Metal by Process Innovation

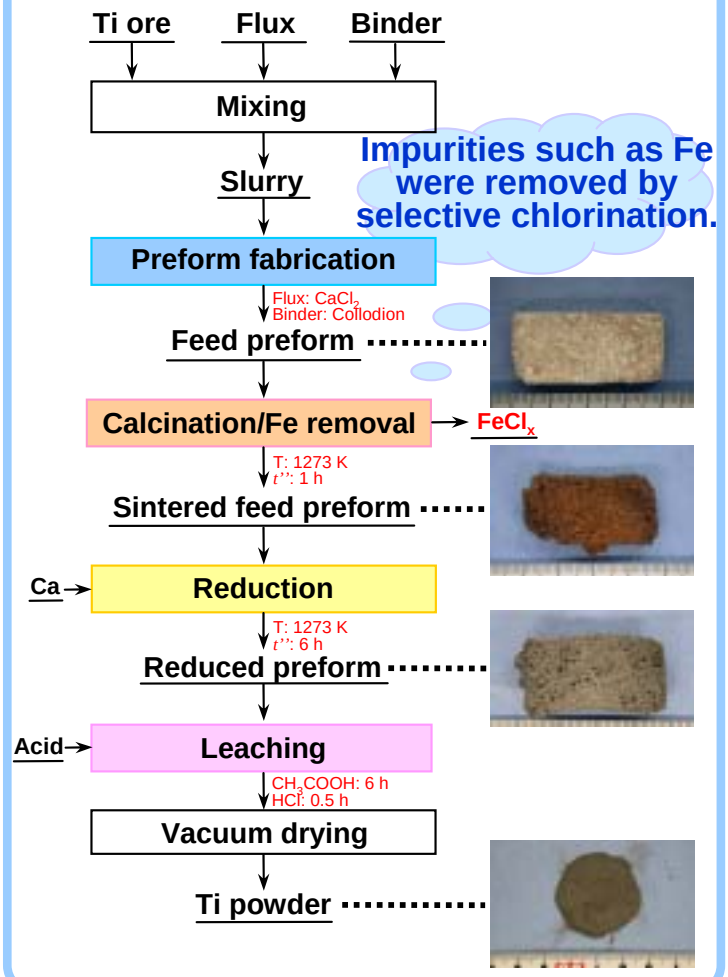
New process for producing Ti powder directly from Ti ore

Experimental apparatus for preform reduction process (PRP)

$MO_x + R \rightarrow M + RO_x$ M = Ti, Nb, Ta; R = Ca, Mg…



Experimental procedure of PRP



Impurities such as Fe were removed by selective chlorination.

Features and experimental results

Comparison of Kroll process and this process

	Kroll process	This process
Process type	Batch-type, limited speed (Complex)	(Semi-)Continuous, high-speed (Simple)
Feed material	$TiCl_4$ (l,g)	TiO_2(s)
Reductant	Mg	Ca
Reactor size	Large (Crush)	Small (No crush, flexible scalability)
Flux, sealant	Not used	$CaCl_2$

Experimental results

Metallic Ti powder with purity of 99 mass% was obtained.

Fe removal by selective chlorination and direct reduction of preform

Arc melting

New process for producing highly pure Ti powder directly from low-grade Ti ore is under development.

New process for producing highly pure metallic Ti powder directly from feed oxides was developed.

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