

# New Scandium Production Process

## New Production Process of Very Scarce Scandium Production of Al-Sc Alloy by Alloying with Al after Reduction of $\text{Sc}_2\text{O}_3$

### What is Scandium?

Scandium (Sc) is classified as a rare earth metal (RE) as well as yttrium (Y) and lanthanid.

Atomic number	21	light metal
Atomic weight	44.96	
Density (g/cm <sup>3</sup> )	2.99	
Melting point ( )	1541	
Clarke number (ppm)	5.5 (50th)	
Price (¥/g)	4,000 ~ 30,000	

Price of Sc is higher than those of Pt and Au.

There is no commercial Sc ore deposits specialized in Sc production, because of scarcity of Sc in the earth's crust.



Sc metal

Sc is currently recovered from the by-product of U or W smelting process.

Recently Sc is focused as a by-product of new Ni production process.

### Main application of Sc



Bicycle for road race

Al-Sc alloy is used as structural material.



MIG29

Metal halide lamp

$\text{ScI}_3$  is encapsulated.

Sc is expected as future material supporting high-tech industry.

Demand for Sc is expected to increase.

### Experimental procedure

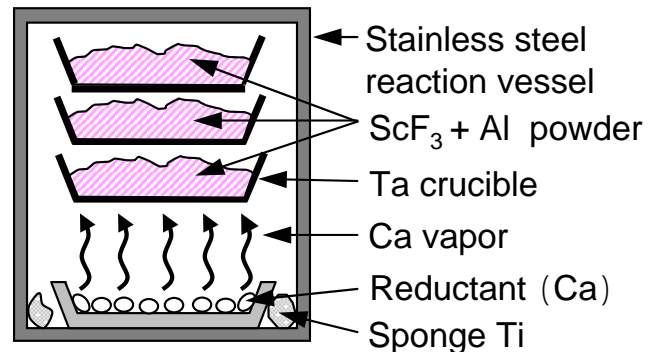
Conventional production process :



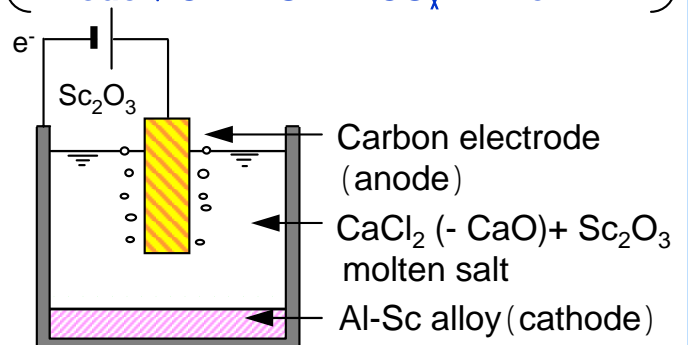
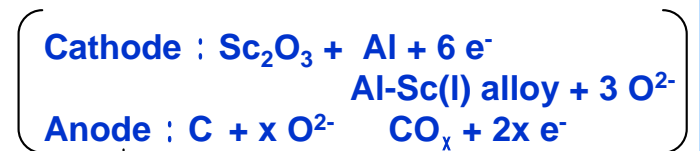
Because metallic Sc is chemically reactive, recovery of Sc by leaching process is difficult.

Sc can be extracted and separated by alloying with collector metal such as Al.

Research Plan (I) : Calciothermic reduction



Research Plan (II) : Molten Salt Electrolysis



Study goal

Development of new process for producing Sc or Al-Sc alloy directly from  $\text{Sc}_2\text{O}_3$

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