

# Nb<sub>3</sub>Sn CYLINDRICAL TARGETS FROM LIQUID TIN DIFFUSION FOR SRF CAVITIES

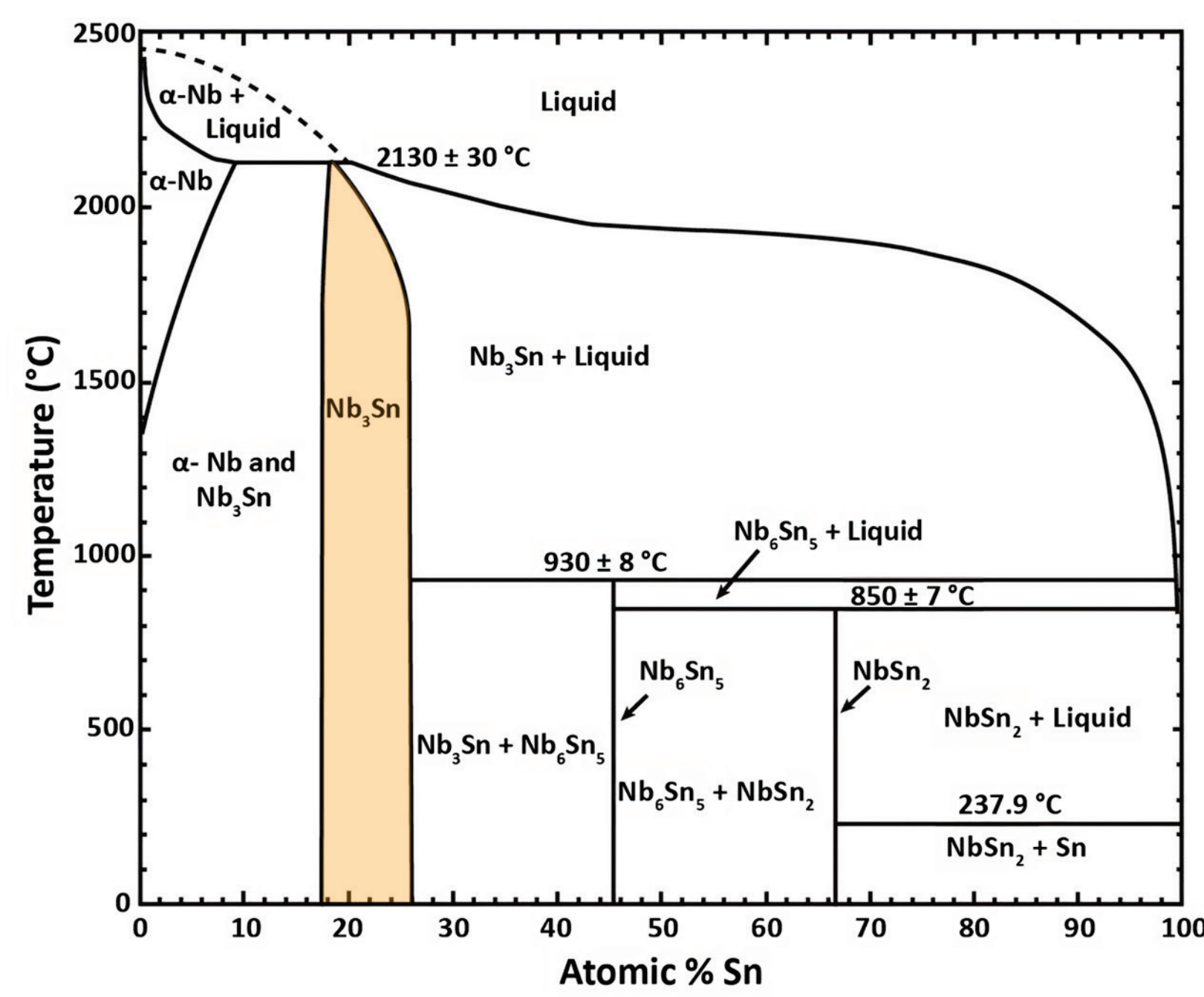


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Nb<sub>3</sub>Sn strategy

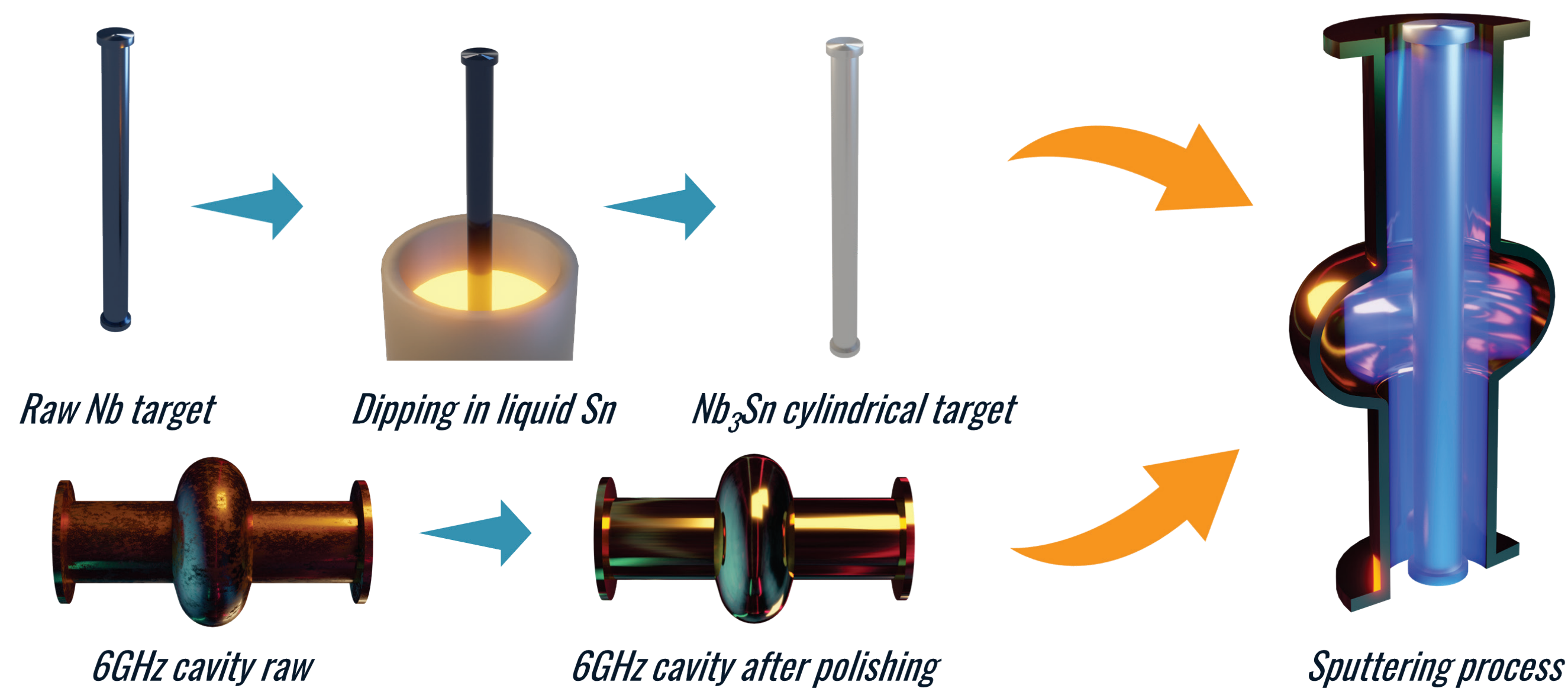
## How Liquid Tin Diffusion works:

Similar to Tin Vapour Diffusion, Sn diffuse onto Nb and react at high T  
Allows growth of thick Nb<sub>3</sub>Sn layer on Nb substrate

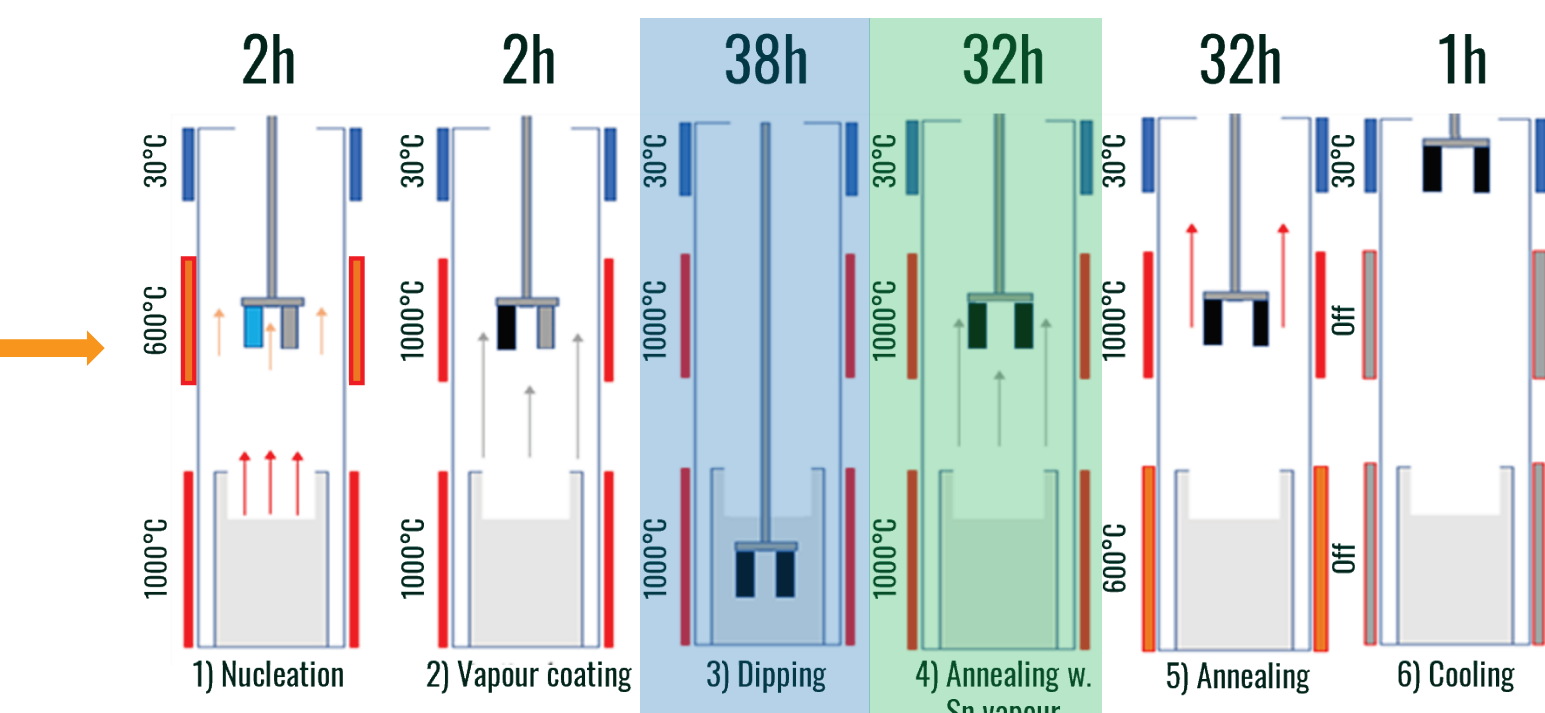


## The ultimate goal:

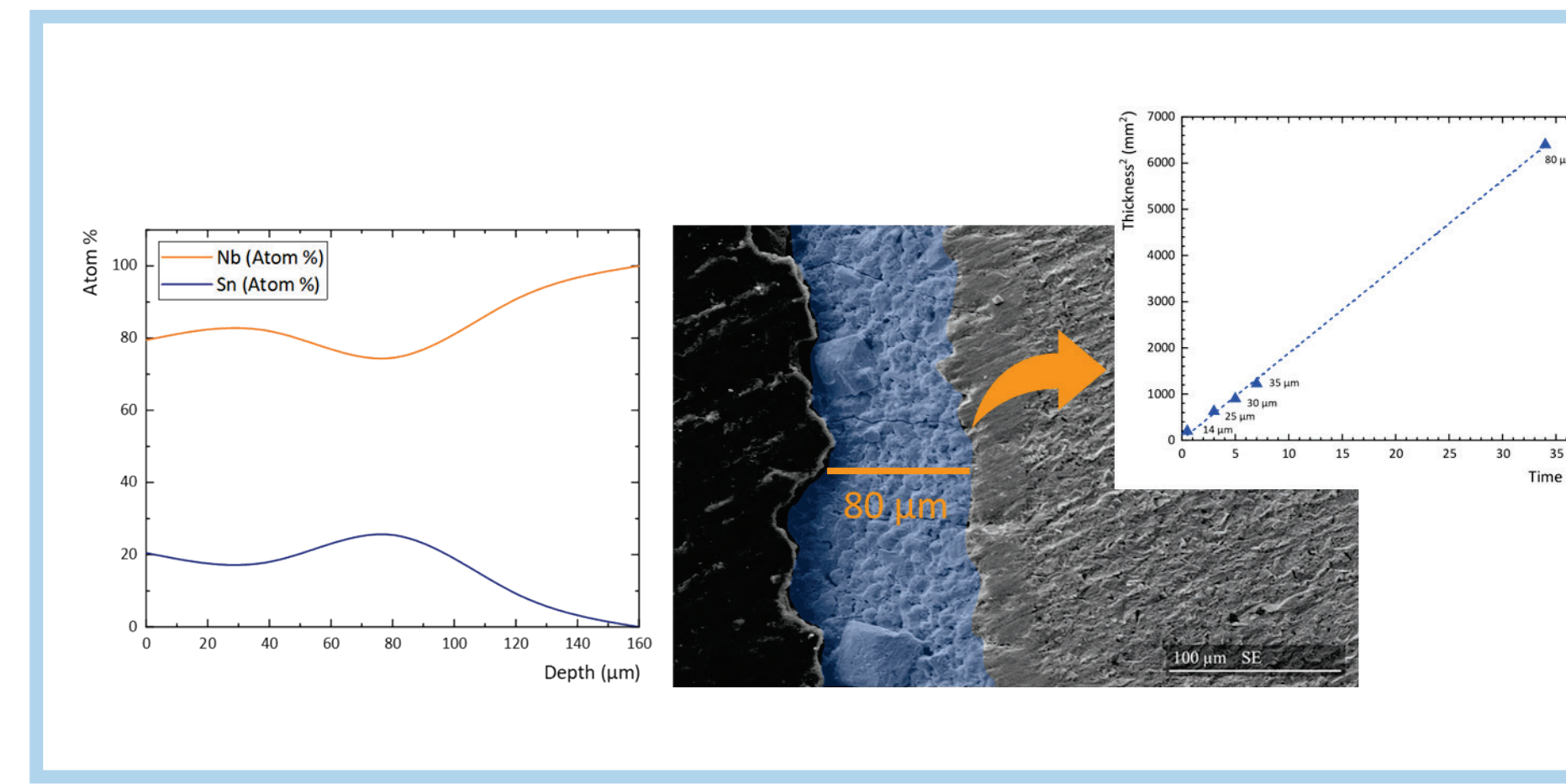
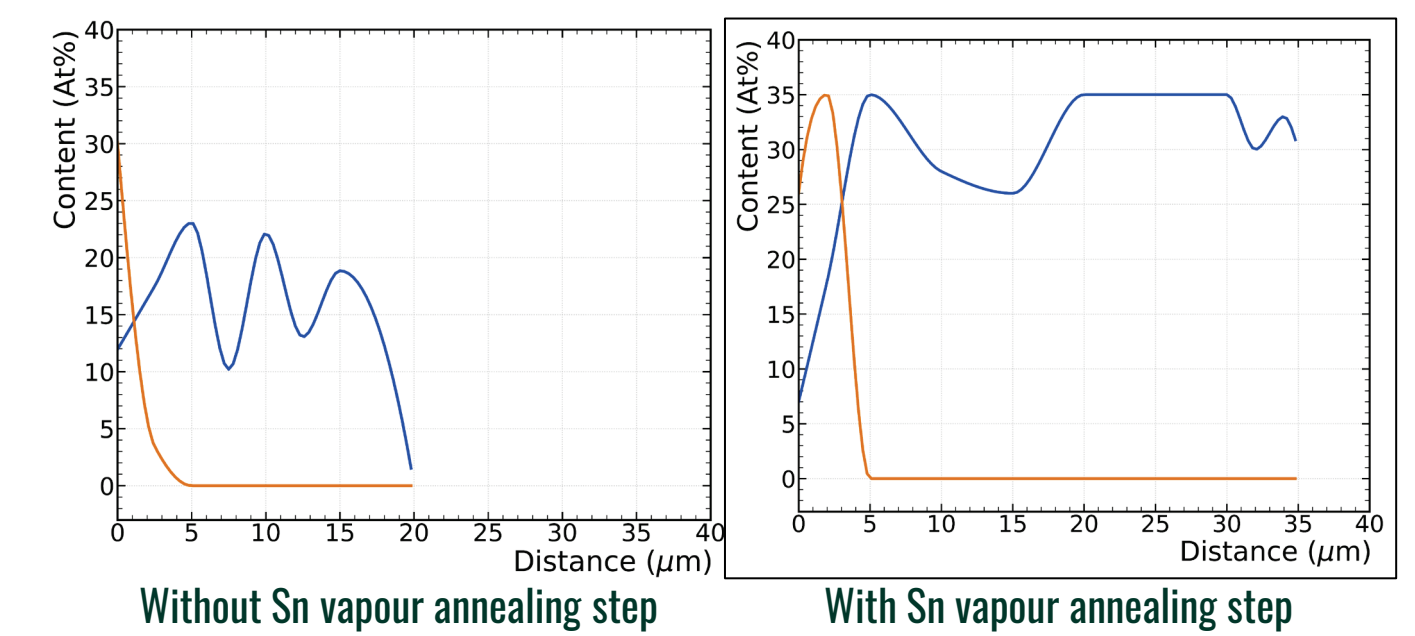
Create cylindrical targets synthesized with LTD process for elliptical cavity sputtering.



- 1) Anodized Nb samples  
1" circular targets are anodized to form a 70nm Nb<sub>2</sub>O<sub>5</sub> layer. Anodization helps film growth and adhesion on the Nb substrate.
- 2) Nb<sub>3</sub>Sn coated samples  
Just after the LTD process, the lower protrusion and hook are cut from the targets to fit the 1" magnetron. The lower protrusion helps eliminating tin droplets.
- 3) 1" magnetron sputtering  
The Nb<sub>3</sub>Sn targets just synthesized are fitted in a commercial 1" magnetron for the sputtering process.



## Tin content modulation by varying the annealing with Sn vapour step

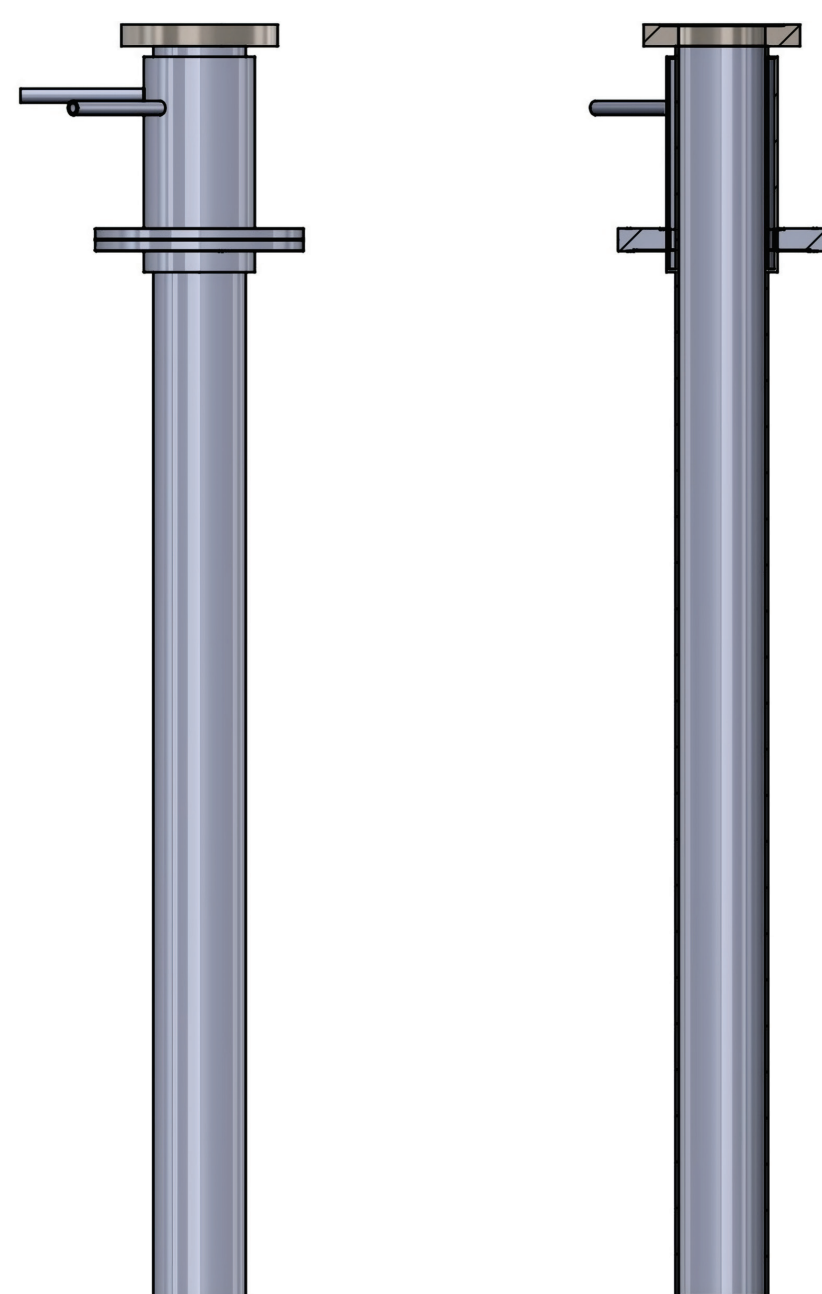


LTD process

New LTD system

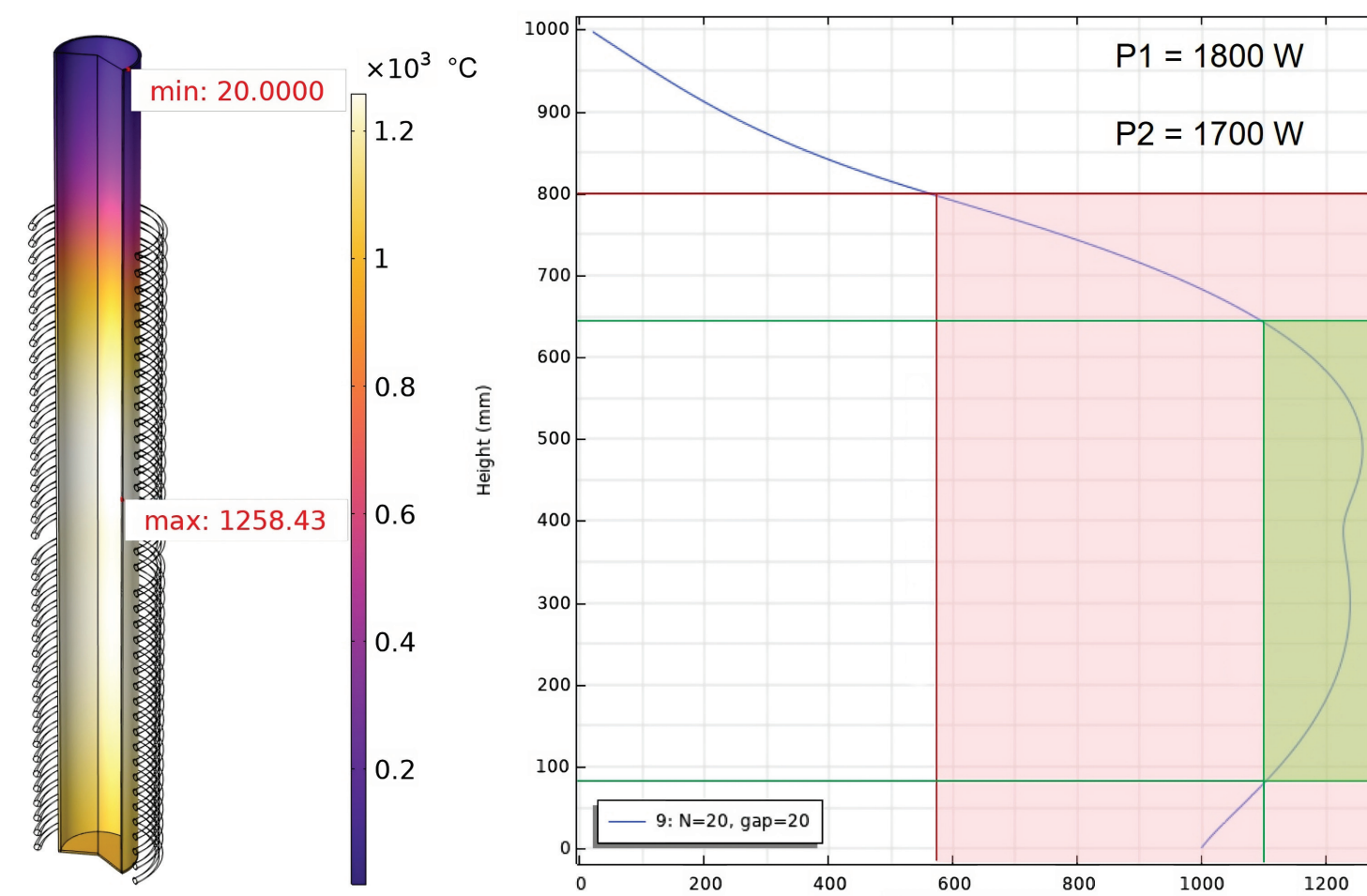
## Bulk Nb chamber:

A new bulk Nb chamber has been constructed to prevent significant Cr contamination caused by the previous use of an Inconel chamber.



## Inductive heating system:

Fully custom inductive heating system to increase the control, efficiency and reliability on the heating system. Possibility of remote control and complete system automation.



## Complete system redesign:

A new custom-built chamber to prevent the premature oxidation of the Nb process chamber. Entirely water cooled and customizable solution.

