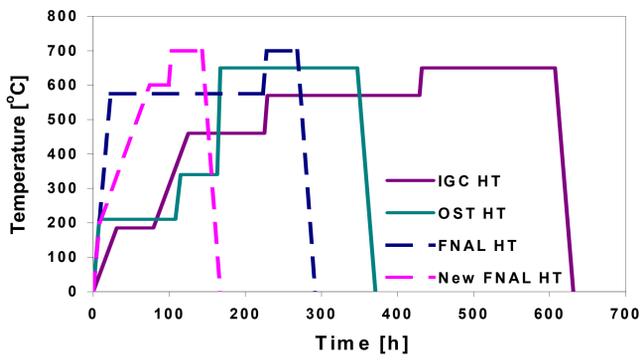
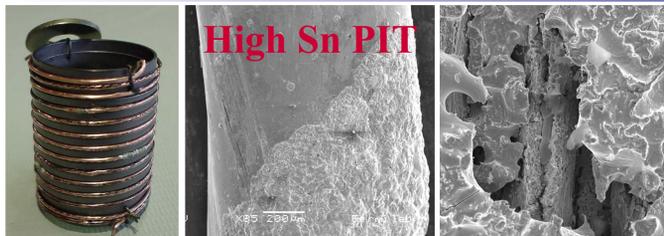


Heat Treatments

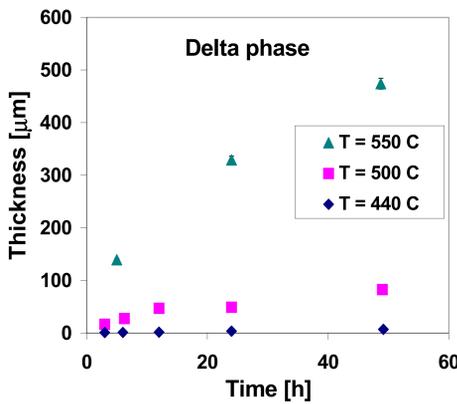
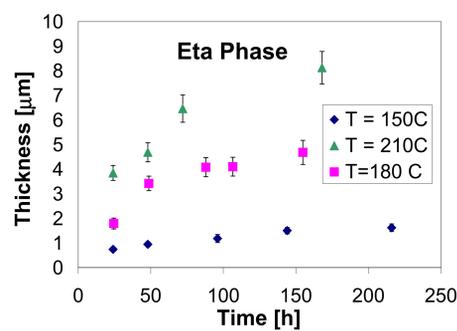
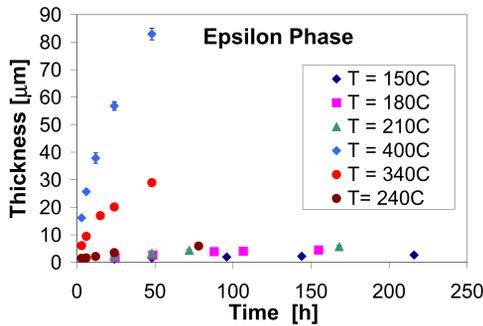


High Sn strands introduce a new issue: bursts of liquid Sn-rich phases.



During heat treatment of Nb₃Sn, several phases are created and eliminated. By measuring the layer growth of a phase with time and temperature, its diffusion coefficient and activation energy can be calculated.

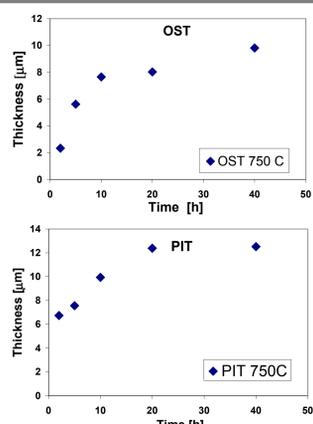
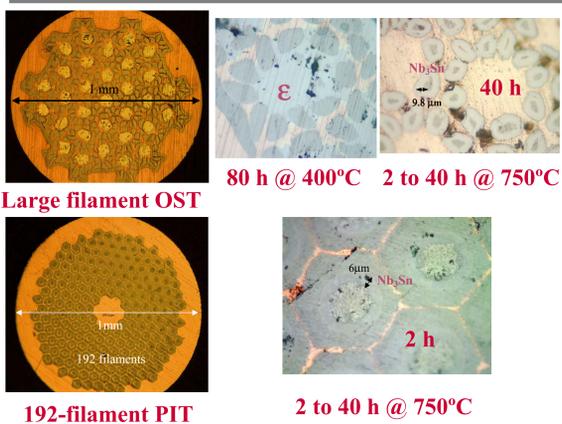
Kinetics of Phase Growth in the Cu-Sn System



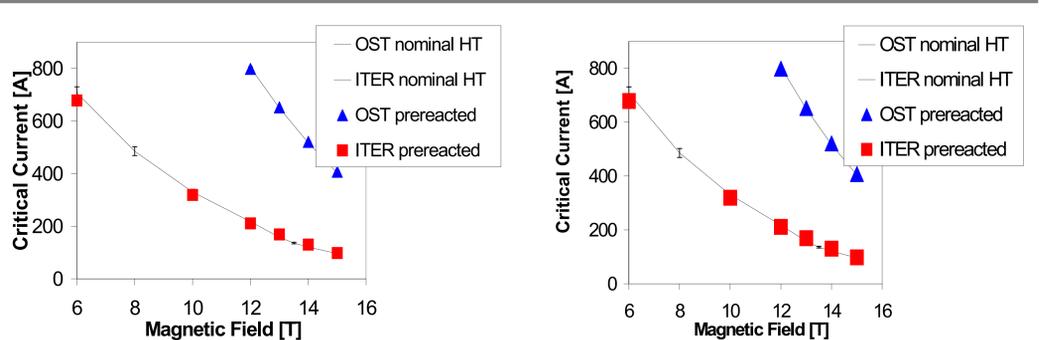
Temperature, °C	Eta phase	Epsilon phase	Delta phase
150	K = 4.8 · 10 ⁻¹⁸ n=2	K = 1.2 · 10 ⁻¹⁷ n=2	
210	K = 1.6 · 10 ⁻¹⁶ n=2	K = 6.4 · 10 ⁻¹⁷ n=2	
240		K = 6.6 · 10 ⁻¹⁸ n=2.24	
340		K = 3.2 · 10 ⁻¹⁴ n=1.83	
400		K = 4.2 · 10 ⁻¹³ n=1.75	
440			K = 1.9 · 10 ⁻⁹ n=1.37

Diffusion coefficient and exponent of the phase growth law $y^n = K \cdot t$

Growth Kinetic of Nb₃Sn

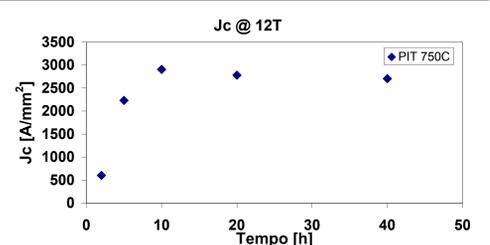
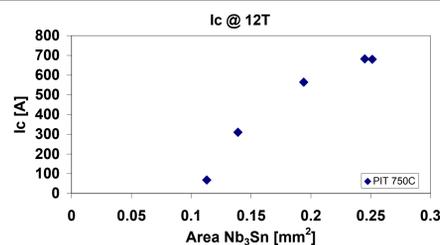
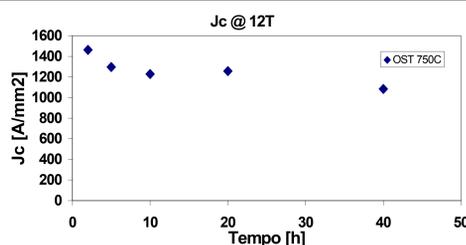
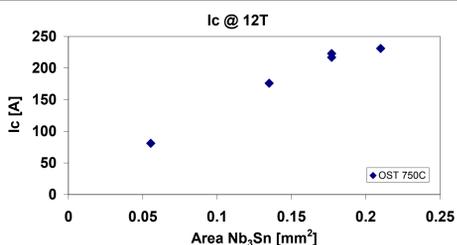


Prereact-Wind-React



Pre-reaction: 7 days @ 210°C Pre-reaction: 2 days @ 400°C

Optimization of High Temperature Steps



Optimization of Low Temperature Steps



Sn casting

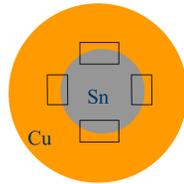
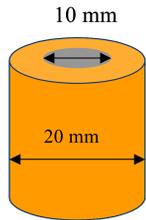


Sample precision cutting



Nitrogen sealing

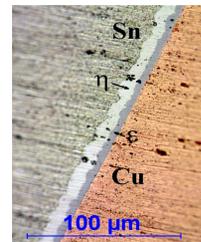
Solid Phase Diffusion



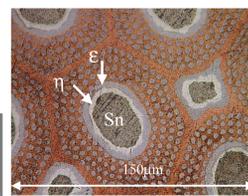
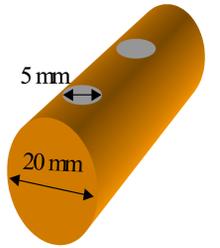
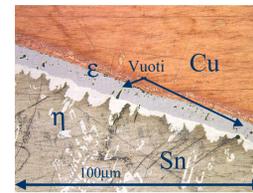
Cu-Sn Diffusion Experiments

7 days @ 210°C

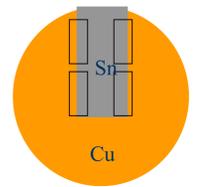
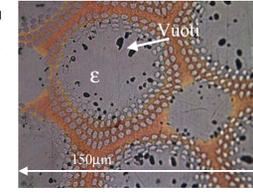
2 days @ 400°C



MODEL



STRAND



Strands vs. Models

