MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1081** Type: **Poster Presentation**

Wed-Af-Po3.21-07 [73]: Superconducting Properties of Internal Tin Nb3Sn Strands, doped with Ti, Zr and Ti, Ti and Ta.

Wednesday, 25 September 2019 14:00 (2 hours)

State-of-art magnetic systems of high-energy physics devices require magnetic fields up to 16 T. Attaining the level of fields in the range of 14-16 T is challenging for Nb3Sn superconductors used for such magnets. In order to increase their critical current density in high fields by optimization of the pinning through the modification of the microstructure of the Nb3Sn filaments, doping with various elements, the introduction of artificial pinning centers, etc. are used.
The paper presents the results of a study of three types of internal tin Nb3Sn strands of the same design, differed by the way of doping with titanium, titanium and zirconium, titanium and tantalum. The diameter of the fabricated strands was 1.0 mm. For the formation of the superconducting phase, a series of two steps heat treatments (HT) were carried out. The temperature of the reaction second stage of HT was varied from 620 to 750 ° C.
The microstructure of the Nb3Sn layer after HT was studied by scanning electron microscopy. Transport properties of the strands samples were measured in magnetic fields up to 18T.
The interrelation of the HT regimes and superconducting properties of the strands investigated, including RRR, Tc and Ic has been analyzed. It has been shown that with an increase of the HT second stage temperature the critical temperature of samples doped with two elements simultaneously shows the tendency to increase, wherein the critical temperature of the samples doped only with titanium has a maximum after HT at a temperature of 700 ℃. Studies of the critical current density of the samples in the wide magnetic field range as a function of the HT second stage temperature are presented.

Primary author: Dr PANTSYRNY, Victor (Bochvqr Institute)

Co-author: Mr ABDYUKHANOV, Ildar (VNIINM (Bochvar Institute))

Presenter: Dr PANTSYRNY, Victor (Bochvqr Institute)

Session Classification: Wed-Af-Po3.21 - Nb3Sn Wires