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## **The influence of heat treatments on the cryogenic properties of Internal-Tin Nb<sub>3</sub>Sn strands**

Two kinds of Nb<sub>3</sub>Sn multifilamentary wires were produced using the internal tin process. For comparison, ITER type wires used in ITER TF coils were also prepared. The fabrication process of these strands was the same and the only difference was the diameter of the wires. All the samples were heat-treated in vacuum using the ITER heat treatment cycles B. Reaction heat treatments at 650°C were performed for 100h, 125h, 150h, 175h, 200h, 225h and 250h. The content of tin in filaments was studied by SEM and EDS analysis. The critical current densities in the non-Cu areas of 1.0mm and 1.5mm diameter wires were 871A/mm<sup>2</sup> and 799A/mm<sup>2</sup> at 12 T, 4.22K after 650°C×100h heat treatment, lower than ITER type wires with 0.820mm diameter, 1050 A/mm<sup>2</sup>. The EDS analysis indicated that higher content of unreacted Nb was observed in 1.5mm diameter wire because of the large size of the filaments. With the increase of heat treatment time, the Nb<sub>3</sub>Sn reaction layer grew gradually. The J<sub>c</sub> of these wires enhanced to 1062A/mm<sup>2</sup> and 1034A/mm<sup>2</sup> after 650°C×250h heat treatment. The effect of heat treatment time on hysteresis losses of the wires are currently under research.

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