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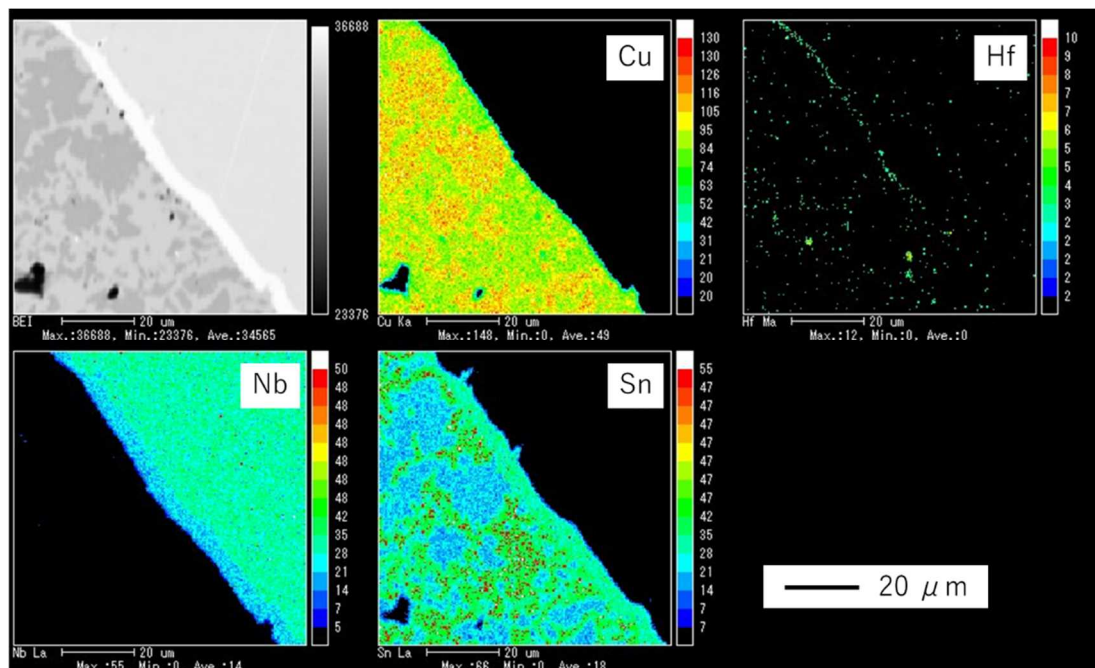
Influence of Hf diffusion for strain effect of Hf doped Nb₃Sn wires

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A Nb₃Sn wire have good superconducting properties at high magnetic fields. However, the superconducting properties of Nb₃Sn wires are very sensitive to stress and strain [1]. It is well known that the critical current of Nb₃Sn wires can be significantly increased by third elements addition [2]. The detailed relationship between the strain effect and third elements are not understood.

In this study, the Nb₃Sn wires with the third element were fabricated through Powder in Tube method. Tensile strain dependence of superconducting properties and the element mapping of cross sections for (Nb,Hf)₃Sn wires were measured. 0.5 ,1.0 and 2.0at%Hf Nb₃Sn wires which have 1.5 mm diameter were prepared. Those wires were heat-treated at 670 or 800°C for 100 h. EPMA composition mapping on the cross section of the 2.0at%Hf doped Nb₃Sn wire with heat treatment of 670 °C for 100 h are shown in Fig.1. This result shows that a Hf-Nb-Sn compound was observed at the boundary between the Nb₃Sn and the Cu-Sn-Hf region.



Keywords: Nb₃Sn wires, strain effect, diffusion, third element