

# thinfilms and NEW IDEAS for SRF

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## Synthesis of Nb<sub>3</sub>Sn on copper and Sapphire

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Nb<sub>3</sub>Sn alloy is a type II superconductor with maximum T<sub>c</sub> of 18 K and predicted superheating field of 400 mT and potentially may offer improvements in both cryogenic efficiency and maximum accelerating field. Hence, Nb<sub>3</sub>Sn thin film can be an alternative superconducting coating either as a single or multilayer for SRF cavity production.

Nb<sub>3</sub>Sn has been deposited from stoichiometric alloy target on copper and single crystal sapphire substrate at room and elevated temperature and with and without Nb buffer layer. Analysis showed that the composition in both room and elevated temperature was within the desired stoichiometry of 24–25 at%, however the superconducting properties was only observed for elevated temperature deposition or post annealing at 650 °C. The critical temperature was determined to be 16.8 K.

### Summary

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