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PVD deposition of Nb3Sn from an alloy target on copper.

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We report on the PVD deposition of Nb3Sn on Cu substrates with and without a thick Nb interlayer to produce Cu/Nb/Nb3Sn and Cu/Nb3Sn multilayer structures. The Nb3Sn was sputtered directly from an alloy target at room and elevated temperatures. The dependence of the superconducting properties of the total structure on deposition parameters has been determined. The films have been characterized via SEM, XRD, EDX and SQUID magnetometer measurements. Analysis showed that the composition at both room and elevated temperature was within the desired stoichiometry of 24–25 at%. However, superconductivity was only observed for deposition at elevated temperature or post annealing at 650 ℃. The critical temperature was determined to be in the range of 16.8 to 17.4 K. In the case of bilayer deposition, copper segregation from the interface all the way to the surface was observed.

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