



Contribution ID: 1186

Type: **Poster Presentation**

## **M2Po2A-08 [32]: Effect of layer thickness on structural, morphological and superconducting properties of Nb<sub>3</sub>Sn films fabricated by multilayer sequential sputtering**

*Tuesday 23 July 2019 13:30 (2 hours)*

Superconducting Nb<sub>3</sub>Sn films can be synthesized by controlling atomic concentration of Sn. Multilayer sequential sputtering of Nb and Sn thin films followed by high temperature annealing is considered as a method to fabricate Nb<sub>3</sub>Sn films where Sn composition of deposited films can be controlled by controlling the thickness of alternating Nb and Sn layers. We report on the structural, morphological and superconducting properties of Nb<sub>3</sub>Sn films fabricated by multilayer sequential sputtering of Nb and Sn films on sapphire substrates with ex-situ annealing at 950 °C for 3 h. We have investigated the effect of Nb and Sn layer thickness on the properties of Nb<sub>3</sub>Sn films. The thicknesses of Nb and Sn layers were varied in two ways: (1) varied Nb:Sn thickness ratio (1:1, 2:1, 3:1, 4:1), and (2) varied layer thickness of both Nb and Sn layers, while keeping constant Nb:Sn thickness ratio of 2:1. The crystal structure, surface morphology, topography, and film composition were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), atomic force microscopy (AFM), and energy dispersive X-ray spectroscopy (EDS) respectively. The results showed Sn loss from the surface due to evaporation during annealing. Superconducting Nb<sub>3</sub>Sn films of critical temperature up to 17.93 K have been achieved.

**Author:** SAYEED, Md. Nizam (Old Dominion University)

**Co-authors:** PUDASAINI, Uttar (The College of William and Mary); Dr REECE, Charles (JLab); EREMEEV, Grigory (Jefferson Lab); Dr ELSAYED-ALI, Hani E. (Old Dominion University)

**Presenter:** SAYEED, Md. Nizam (Old Dominion University)

**Session Classification:** M2Po2A - Thin Films, Artificial Structures, Flux Pinning