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Synthesis and Characterization of $\text{Mo}_x\text{Nb}_{1-x}$ Films Superconducting at 100-200mK

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We have developed a new transition edge sensor (TES) material with transition temperature in the range 100-200mK. The new material is a solid solution of two superconducting components, $\text{Mo}_x\text{Nb}_{1-x}$, co-sputtered from two high-purity single-component targets (Mo and Nb). The transition temperature, T_c , has a minimum ($dT_c/dx=0$) at intermediate concentration of the components. We have optimized deposition parameters and composition to provide films with a sharp superconducting transition at $\sim 150\text{mK}$. We investigated structural features of the films and surface morphology using X-ray diffraction (XRD) and Scanning Electron Microscopy. The XRD measurements indicate that grown films are polycrystalline, with a preferred orientation along the (110) crystal direction, and a clear correlation between superconducting properties and film microstructure.

Less than 5 years of experience since completion of Ph.D

N

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