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Template-based electrodeposition of niobium nanowires KIRSTEN BLAGG, Colorado School of Mines, TAMARA GREYMOUNTIAN, Southwestern Indian Polytechnic Institute, WOLFGANG KERN, MEENAKSHI SINGH, Colorado School of Mines — One dimensional superconducting nanowires have been studied widely for their unique properties and potential applications. In particular, the high critical temperature, high critical magnetic field, resistance to oxidation, and high stability of niobium makes it popular in both arenas. Niobium nanowires have been fabricated through the use of sputtering, molecular beam epitaxy (MBE), lithography and etching techniques. However, these methods are difficult to control, limit nanowire manipulation, and require costly equipment. In this work, we develop a technique for template-based electrodeposition of superconducting niobium nanowires as a simple low cost method to fabricate free standing nanowires. Optimal growth conditions for nanowires are determined using cyclic voltometry. X-ray diffraction and scanning electron microscopy are used to structurally characterize the nanowires. Low temperature resistivity measurements are made in template to determine the superconducting properties of the nanowires.

Kirsten Blagg
Colorado School of Mines

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