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Strontium-Osmium-oxide films by molecular beam epitaxy[1]
TOMMY BOYKIN II, University of Central Florida, YOSHIHARU KROCKENBERGER, Nippon Telegraph and Telephone (NTT) Basic Research Laboratories — Metallic SrO-OsO_2 thin films were grown on (001)-oriented $SrTiO_3$ and Lanthanum-Strontium-Aluminum-Tantalum (LSAT) substrates by molecular beam epitaxy as a function of substrate temperature from 480 to 650 C. We explored the SrO-OsO_2 ternary phase diagram to establish appropriate thermodynamic conditions to synthesize the possibly-superconducting Sr_2OsO_4 phase. X-ray diffraction showed that crystallographic phase of the resulting film depended on substrate temperature. Temperature dependent resistivity was measured by four-probe method from 300 to 4 K. The lowest room temperature resistivity achieved was 0.467 mΩ-cm for a film grown at 480 C. The resistivity achieved at 4 K was 0.480 mΩ-cm. Superconducting osmate films have potential applications in quantum computers.

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