Free-Standing Epitaxial $SrTiO_3$ Nanomembranes via Remote Epitaxy using Hybrid Molecular Beam Epitaxy

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With a rapidly growing family of vdW materials, the role of dielectric and metals have become more important than ever. In this talk, we will present a detailed synthesis, and characterization of various complex oxide nanomembranes as a high-*k* dielectric. We will present a detailed growth study of $SrTiO_3$ (STO) nanomembranes. Using hybrid molecular beam epitaxy that employs a metal-organic precursor, titanium isopropoxide (TTIP), to supply both Ti and oxygen (without the need for additional oxygen), epitaxial STO films were grown directly on a graphene layer transferred on to bulk STO substrate. Films were then successfully exfoliated and transferred onto other substrates. Using Raman spectroscopy and high-resolution X-ray diffraction, we show that the transferred STO membrane is single-crystalline and can be integrated with other vdW materials.