

Three Dimensional, Biaxially-Textured Oxide Nanofence Comprising Single Crystal, MgO Nanobelt Segments

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Technology Summary

A unique, three-dimensional (3D), biaxially-textured, MgO, nanofence comprised of single crystal MgO nanobelt segments or links was synthesized via epitaxial growth on (100) SrTiO₃ substrates. Individual single crystal MgO nanobelt segments comprising the nanofence have a square cross-section with dimensions in the range of 10-20 nm and with lengths in the range from 100 nm upto 1 μm. X-ray diffraction shows that the 3D MgO nanofence has an epitaxial relation with (100) SrTiO₃ substrates with a cube-on-cube, {100}<100> orientation and with a full-width-half-maximum values of (200) θ -scan and (110) θ -scan with 4.5 θ and 5.5 θ , respectively. Such a biaxially-textured oxide nanofence with single crystal segments can be used as 3D nanotemplated substrate for epitaxial growth of wide-ranging, 3D, electronic, magnetic and electromagnetic nanodevices.

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