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## Epitaxial Growth of Spinel Iron Vanadate Thin Films on Perovskite Substrate

Epitaxial spinel  $\text{FeV}_2\text{O}_4$  (FVO) films of  $\sim 80$  nm thickness were grown on (001)  $\text{SrTiO}_3$  (STO(001)) substrates by pulsed laser deposition (PLD) technique. By using in-situ RHEED, we find that FVO grows in an island growth mode with a spot-like RHEED pattern observed. Both the X-ray diffraction (XRD) and transmission electron microscopy (TEM) analysis showed that the FVO film have a single-phase spinel structure and is epitaxially cubic on cubic grown on STO(001) substrate. With a 7% lattice mismatch between bulk FVO and STO, Moire fringes along the interface were observed from the film cross-section TEM images, which indicates that the FVO/STO film have a semicoherent-type interface. The NT1 ( $\sim 120$  K) and NT2 ( $\sim 45$  K) were observed in the magnetization-temperature measurement via superconducting quantum interference device (SQUID). The X-ray magnetic circular dichroism (XMCD) and X-ray absorption spectroscopy (XAS) analysis confirmed that the valance status of the Fe and V ions of the spinel oxide FVO film are divalent and trivalent, respectively, as well as the antiparallel arrangement of the Fe and V spins below the NT1 ( $\sim 120$  K).

Primary author: Mr ZHOU, Dongyi (School of Materials Sci. & Eng. UNSW)

Co-authors: Prof. VALANOOR, Nagarajan (School of Materials Sci. & Eng. UNSW); Dr HE, Qing (Department of Materials Science and Engineering, National Chiao Tung University); Ms ZHOU, Yanyu (School of Materials Sci. & Eng. UNSW); Prof. CHU, Ying-Hao (Department of Materials Science and Engineering, National Chiao Tung University)

Presenter: Mr ZHOU, Dongyi (School of Materials Sci. & Eng. UNSW)