

Supplementary Materials: Effect of Film Thickness on Microstructural and Magnetic Properties of Lithium Ferrite Films Prepared on Strontium Titanate (001) Substrates

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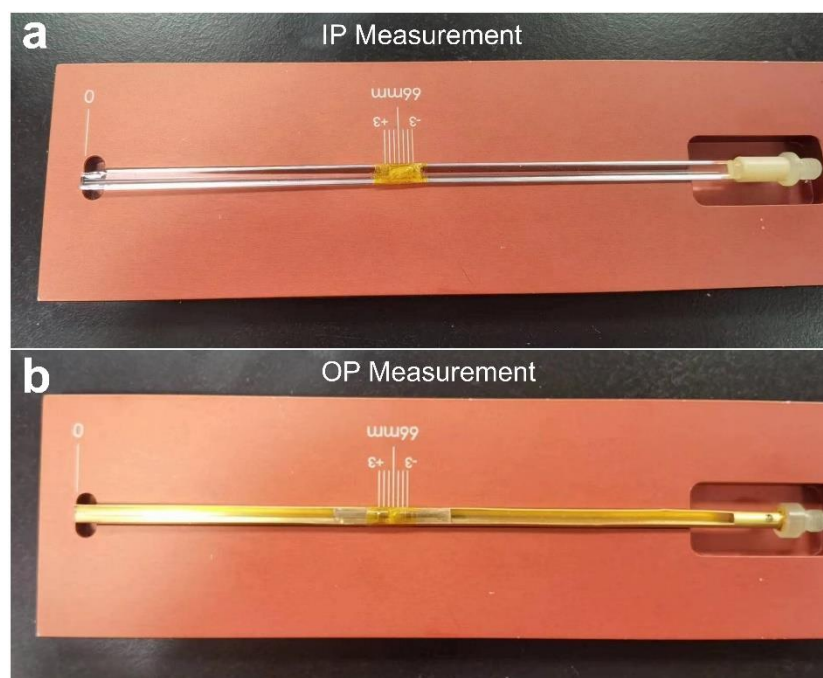


Figure S1. Magnetic set-up for (a) in-plane (IP) and (b) out-of-plane SQUID measurements.

The film sample is a rectangular sheet with a size of $2.5 \times 5 \text{ mm}^2$ for in-plane measurement and $2.5 \times 2.5 \text{ mm}^2$ for out-of-plane measurement. For in-plane measurement along the SrTiO_3 [100] direction, the samples were wrapped in polyimide tape with the SrTiO_3 [100] direction parallel to the quartz paddle (Figure S1a). For out-of-plane measurement along the SrTiO_3 [001] direction, the samples were clamped with quartz cylinders and wrapped in the polyimide tape (Figure S1b).

Table S1. Saturation magnetization (Ms) of LiFe₅O₈ films with different thicknesses grown on different substrates in the literature.

Heterostructure	Film Thickness/nm	Ms (in plane/out of plane)/(emu/cc)	Ref
LiFe ₅ O ₈ /MgAl ₂ O ₄ (001)	53	154/189	[10]
LiFe ₅ O ₈ /Al ₂ O ₃ (0001)	60	152/118	[8]
LiFe ₅ O ₈ /Al ₂ O ₃ (0001)	135	225/175	[8]
LiFe ₅ O ₈ /MgO (001)	100	120/--	[14]
LiFe ₅ O ₈ /SrTiO ₃ (001)	50	48(IP)	[36]
LiFe ₅ O ₈ /SrTiO ₃ (001)	100	60(IP)	[36]
LiFe ₅ O ₈ /SrTiO ₃ (001)	7.5	583/463	This work
LiFe ₅ O ₈ /SrTiO ₃ (001)	30	204/154	This work

Table S2. In-plane (IP) and out-of-plane (OP) magnetic parameters of 7.5 nm thick film and 30 nm thick film.

Parameters (INP/OP)	7.5 nm (IP/OP)	30 nm (IP/OP)
Ms(emu/cc)	583/463	204/154
Hc(Oe)	65/140	215/166
Mr(emu/cc)	45/43	71/15
Hk(Oe)	13/29	44/36
Ku/(J/m ³)	$3.19 \times 10^3/5.22 \times 10^3$	$1.52 \times 10^3/1.54 \times 10^3$
$K_{eff}/(J/m^3)$	$+2.03 \times 10^3$	$+0.02 \times 10^3$
$K_{eff} \times t(J/m^2)$	1.52×10^{-5}	0.06×10^{-5}

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