Supplementary Information (SI) for RSC Advances.
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Supporting Information

The magnetic exchange coupling and photodetection multifunction characteristics in MnSe/$LaMnO_3$ heterostructure

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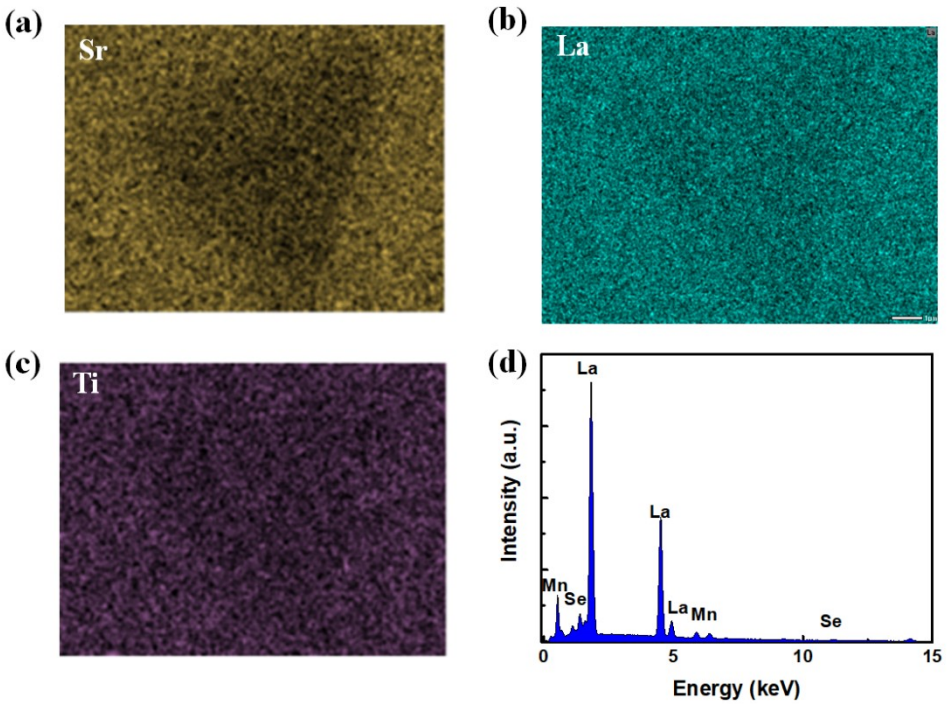

Figure S1 (a-b) The Sr and La elemental images of MnSe/LMO heterostructure. The triangular shape is blurry due to the thinner thickness of MnSe nanosheet. (c) The Ti elemental image of STO substrates. (d) The SEM-EDS analysis of MnSe/LMO heterostructure on grids.

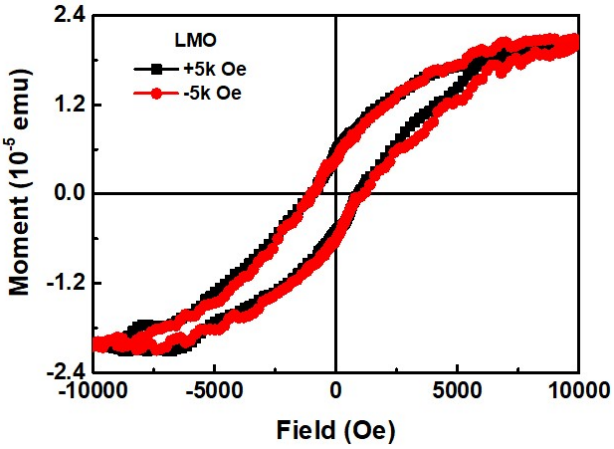

Figure S2 The different cooling field magnetic hysteresis loops of single LMO film along in-plane direction at 10 K, respectively.

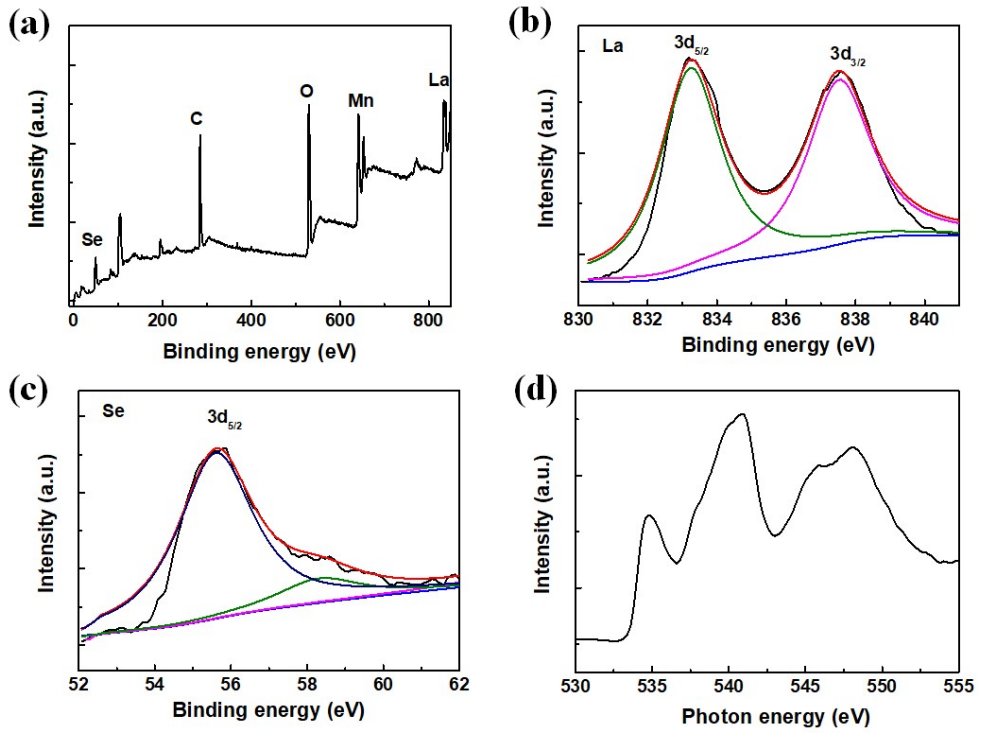

Figure S3 (a) The full spectrum diagram of MnSe/LMO heterostructure, where the La, Mn, Se elements can be observed. (b-c) The XPS fine spectra of La 3*d* and Se 3*d* orbitals, respectively. (d) The X-ray absorption spectroscopy of O element for MnSe/LMO heterostructure.