

S1. Components of the flux-grown EuBiTe_3 flake

The energy dispersive spectrum (EDS) analysis of the Flux-grown EuBiTe_3 flake is shown in Fig. S1. Components of the flake are deviated from the ideal stoichiometric ratio, with a deficiency of Bi atoms. According to previous studies,^[1] that is the partial occupancy character for Bi elements.

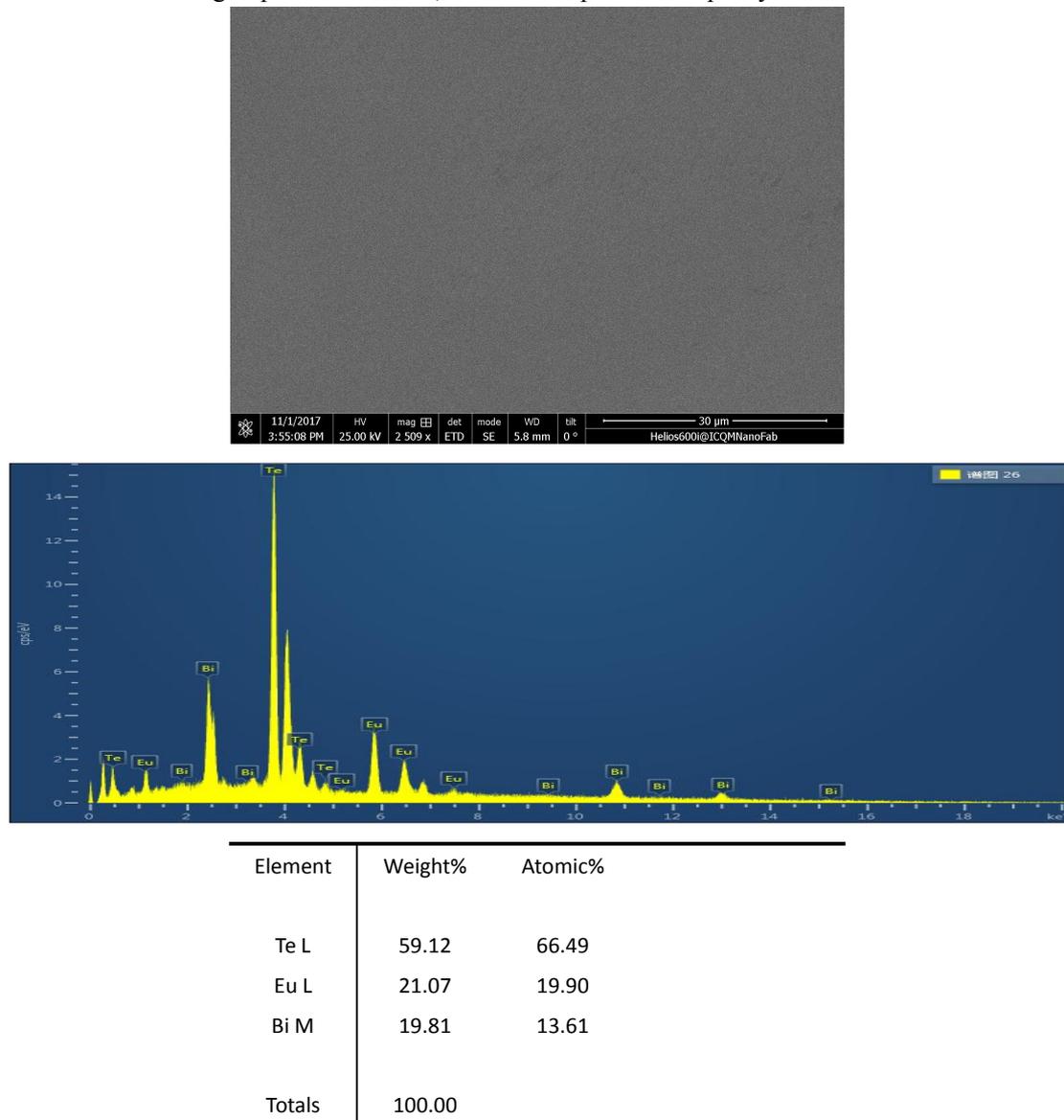


Figure S1. EDS analysis of the EuBiTe_3 flake

S2. Time-dependent photoresponse at various light intensities

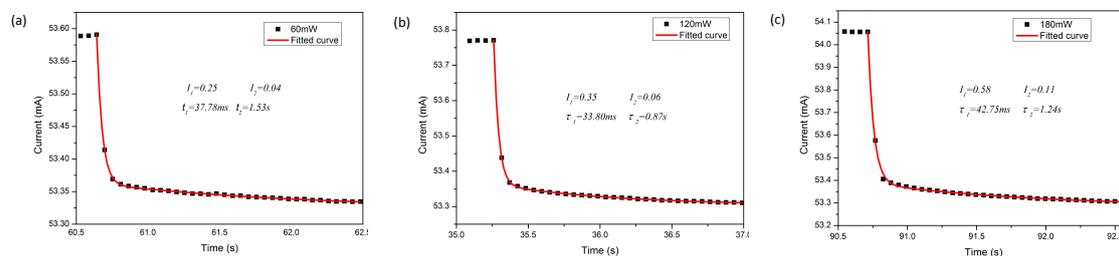


Figure S2. The photoresponse of our detectors decay process(bottom panel) at wavelengths of 1550 nm under various output power.

From the Figure S2, we can see that the corresponding decay time of the output power of 60mW, 120mW, 180mW is 37.78ms, 33.80ms, and 42.75ms, respectively. Suggesting the time-dependent show weak light intensity dependence in our device.

S3. The responsivity as a function of light intensity

The responsivity show weak light intensity dependence in our device.

Table S1. The responsivity as a function of light intensity

Output power	60mW	120mW	180mW	240mW
Responsivity	1.69	1.74	1.63	1.70

The Responsivity (R) and detectivity (D*) were calculated using the following equation:

$$R = I_{ph} / P_{in}$$

$$P_{in} = \frac{P_{out}}{A_s} \cdot A$$

$$D^* = A^{1/2} R / (2qI_d)^{1/2}$$

Where I_{ph} , P_{in} , P_{out} , A_s , A , q , I_d are photocurrent, incident light power, laser output power, laser spot area, active area, the unit of elementary charge, dark current, respectively.

Due to the extremely high dark current at the magnitude of 10^{-3}A , leading to a detectivity of $0.6 \times 10^{-9} \text{cm Hz}^{1/2} \text{W}^{-1}$.

Reference

[1] Niu Y Y, Wu D, Shen L, et al. A layered antiferromagnetic semiconductor EuMTe_3 ($\text{M} = \text{Bi}, \text{Sb}$)[J]. *physica status solidi (RRL) - Rapid Research Letters*, 2015, 9(12):735-739.