Supplementary Information

Tunable Structural and Optical Properties of $Bi_2Se_xTe_{3-x}$ Thin Films: Implications for Nonlinear Optical Applications

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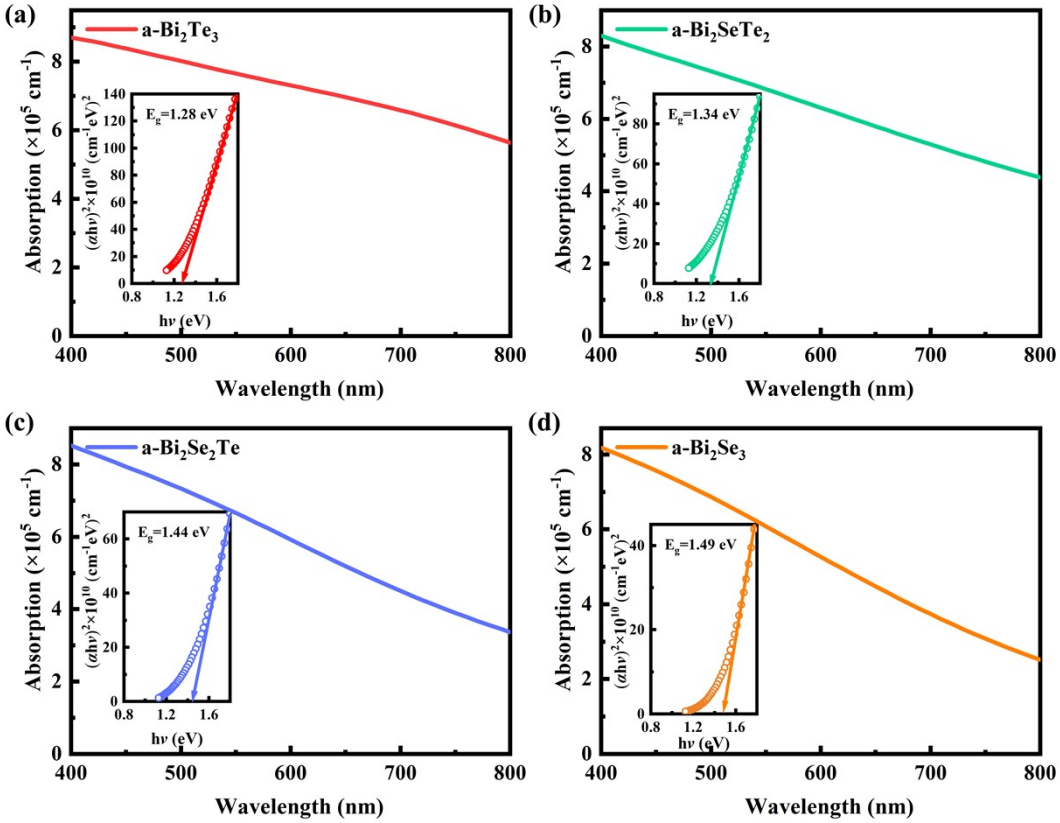

Fig. S1. Absorption coefficient spectra and Tauc plots (insets) of a-$Bi_2Se_xTe_{3-x}$ thin films: (a) a-Bi_2Te_3, (b) a-Bi_2SeTe_2 (c) a-Bi_2Se_2Te, (d) a-Bi_2Se_3.

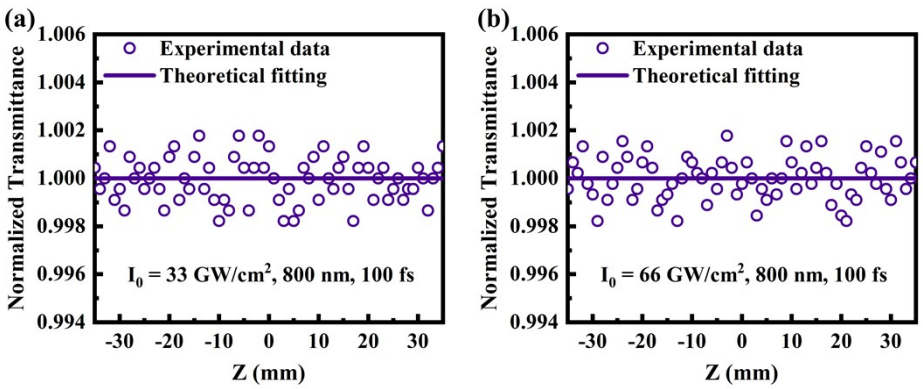

Fig. S2. Open-aperture Z-scan curves for clean fused quartz at low incident light intensities of (a) 33 GW/cm^2 and (b) 66 GW/cm^2.

Table S1 Comparison of the nonlinear optical parameters for different materials.

Samples	Laser	β (cm/GW)	Reference
Graphene	800 nm, 1 kHz, 100 fs	$-(1.52 \pm 0.42) \times 10^{-2}$	[1]
MoS_2	800 nm, 1 kHz, 100 fs	$-(2.42 \pm 0.80) \times 10^{-2}$	[1]
$MoSe_2$	800 nm, 1 kHz, 100 fs	$-(2.54 \pm 0.60) \times 10^{-3}$	[1]
$MoTe_2$	800 nm, 1 kHz, 100 fs	$-(3.7 \pm 1.2) \times 10^{-3}$	[1]
WS_2	800 nm, 1 kHz, 40 fs	-397 ± 40	[2]
TiS_2	800 nm, 1 kHz, 120 fs	-62.6	[3]
In_2Te_3	800 nm, 1 kHz, 100 fs	-805.6	[4]
Graphene Oxide	800 nm, 10 kHz, 85 fs	~ -4	[5]
Black Phosphorus	800 nm, 1 kHz, 100 fs	$-(4.08 \pm 0.11) \times 10^{-3}$	[6]
$Bi_2Se_xTe_{3-x}$	800 nm, 1 kHz, 100 fs	$(-542.54 \pm 12.56) \sim (-4256.39 \pm 31.42)$	This work

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