

## Supplementary information

### **Raman scattering spectroscopy of MBE grown thin film topological insulator $\text{Bi}_{2-x}\text{Sb}_x\text{Te}_{3-y}\text{Se}_y$**

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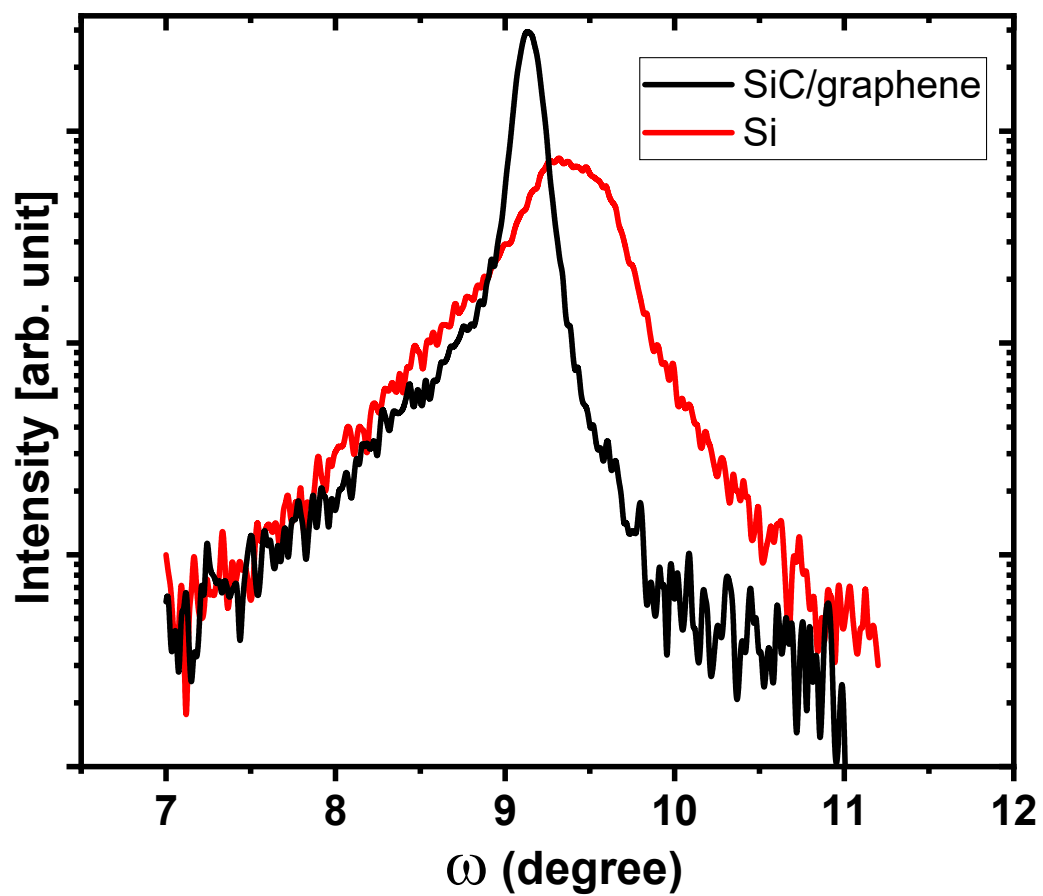
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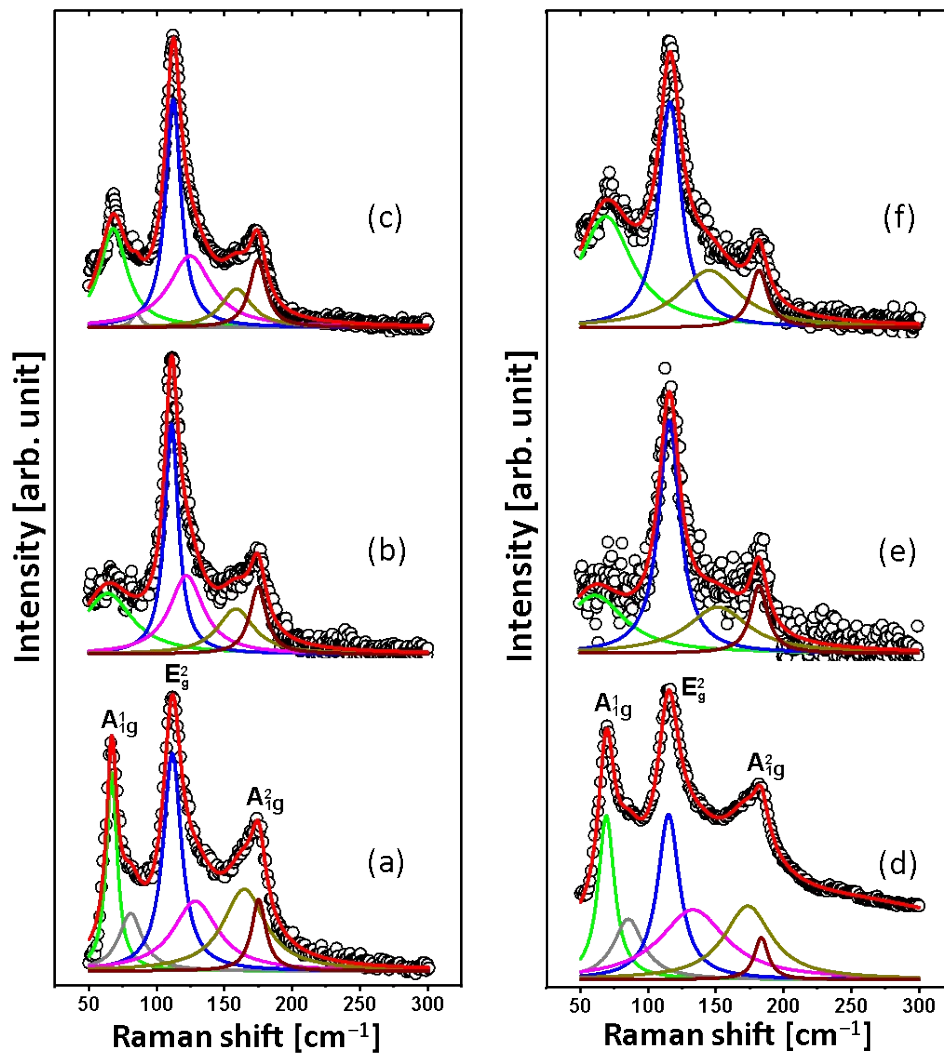
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**Fig. 1-SI.** X-ray rocking curve of BSTS films grown on the Si (111) and SiC/graphene substrates.



**Fig. 2-SI.** Photon energy dependent unpolarized Raman spectroscopy of BSTS film grown on the Si substrates ( curves a, b and c) and SiC/graphene substrate (curves d, e, and f); three different laser excitations (a and d) 532 nm (b and e) 638 nm and (c and f) 785 nm.