

Supporting information

Nontrivial Topology and Topological Phase Transition in Two-Dimensional Monolayer Tl

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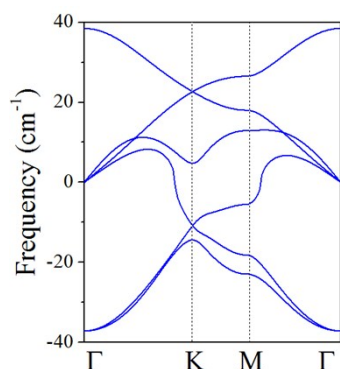


Fig. S1 Calculated phonon spectrum of *h*-Tl monolayer. Note that a large soft mode frequency appears at the Γ point, indicating it is dynamic unstable.

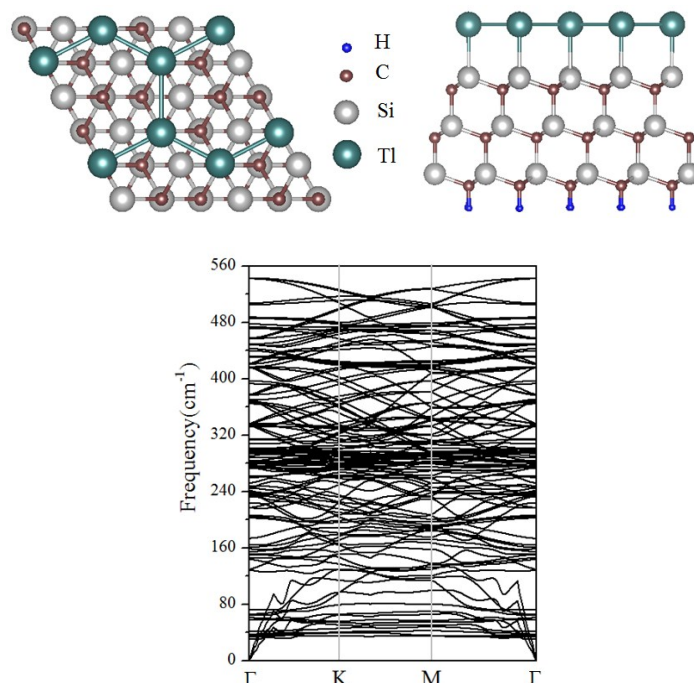


Fig. S2 Model of monolayer *h*-Tl placed on the threefold-symmetric SiC(0001) substrate in ($\sqrt{3} \times \sqrt{3}$) commensurate registry. As expected, the soft mode frequency is removed due to the effect of SiC substrate. Experimentally, by using a well-controlled fabrication method such as molecular beam epitaxy (MBE), a periodic monolayer Tl has been grown on a Si (111) [1, 2] and Ge (111) [3]

substrates. Obviously, the investigation on free-standing h -TI provides an interesting platform to well explore TI-based 2D materials.

References:

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- [2] S. D. Stolwijk, A. B. Schmidt, M. Donath, K. Sakamoto and P. Kruger, Phys. Rev. Lett., 111, 176402 (2013).
- [3] P. Eickholt, P. Kruger, S. D. Stolwijk, A. B. Schmidt and M. Donath, Phys. Rev. B, 93, 085412 (2016).