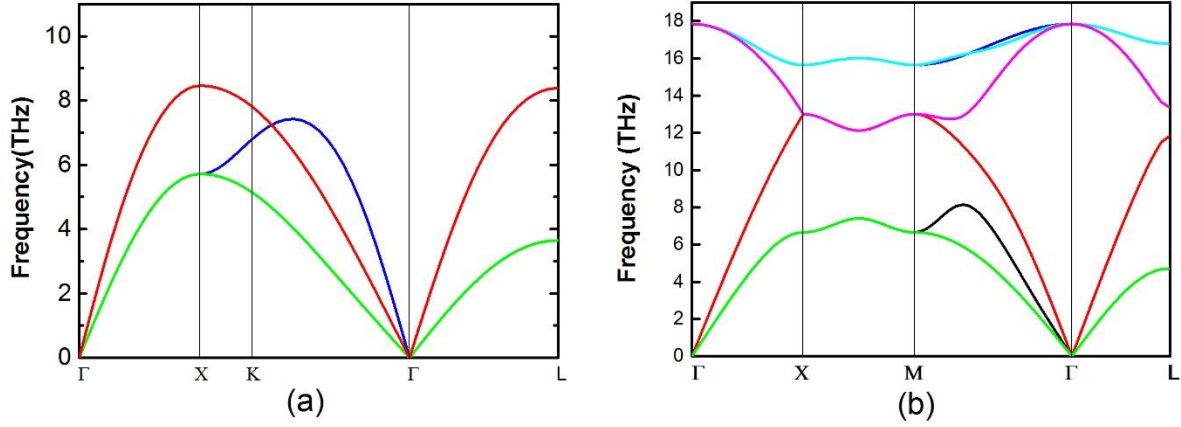


### SII. The phonon dispersion relationship of Al and Si.

The phonon dispersion relationship was obtained by using the general utility lattice program (GULP). It is shown that the highest frequency of phonon in Si ( $\sim 16$  THz) is much larger than those in Al ( $\sim 8$  THz). However, the high frequency phonons in Si ( $> 8$  THz) will not contribute to the TIC because the model only takes elastic scattering into account. So in our model, we only consider the overlap frequency of two materials.



**FIG S2.** Phonon dispersion relationship of (a) Al and (b) Si, respectively.