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New insight into the structural evolution of $PbTiO_3$: An unbiased structure search

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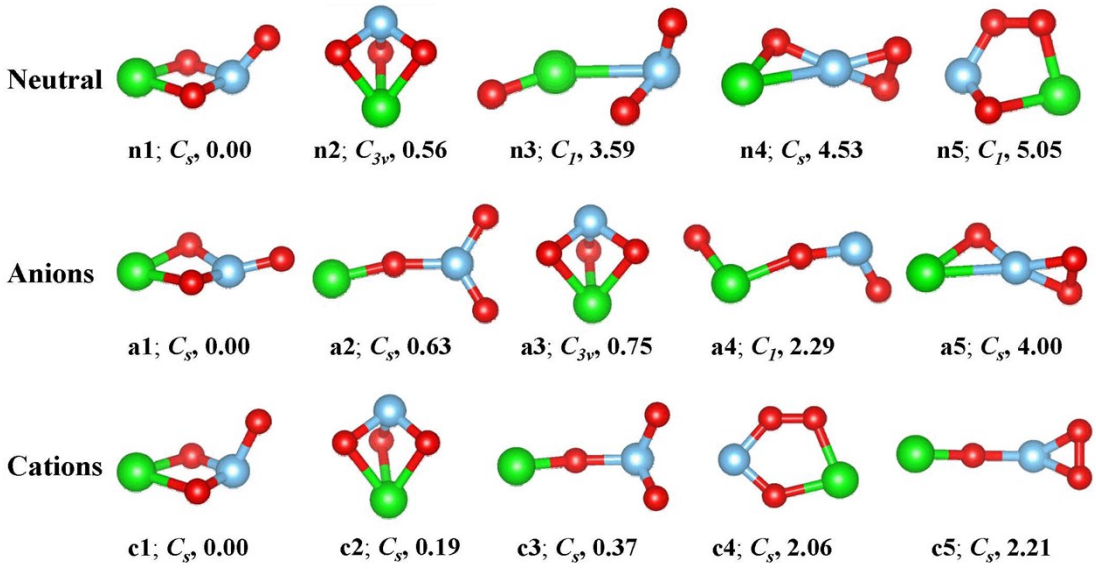

Figure S1. The metastable structures of neutral and charged $PbTiO_3$ clusters, together with symmetry and relative energy corresponding to the ground state structures.

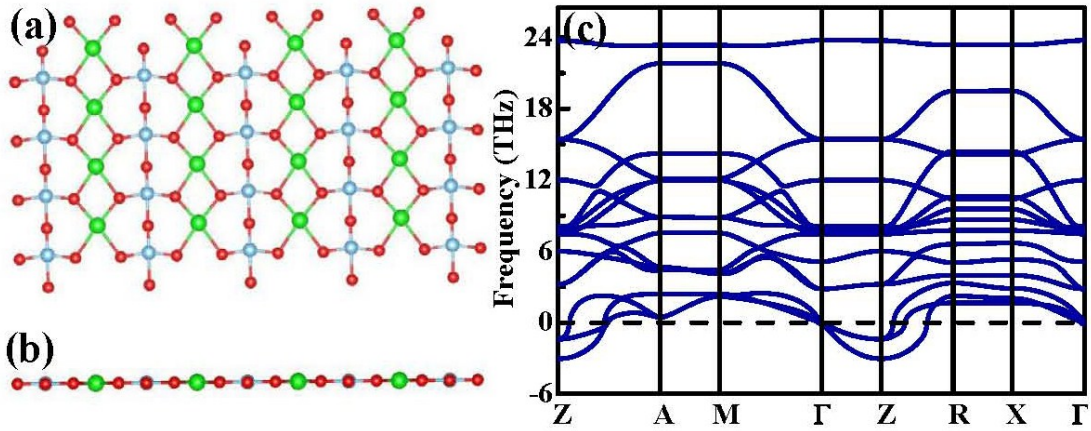

Figure S2. The ball and stick model (Top (a) and side (b) views), phonon dispersion relations (c) of the lowest energy two-dimensional (2D) monolayer $PbTiO_3$.