

FIG. 1. (Color online) For VCClBr monolayer, (a): to simulate the topological edge states, the constructed nanoribbon; (b): the 2D BZ of VCClBr and projected edge BZ for nanoribbons together with high symmetry points.

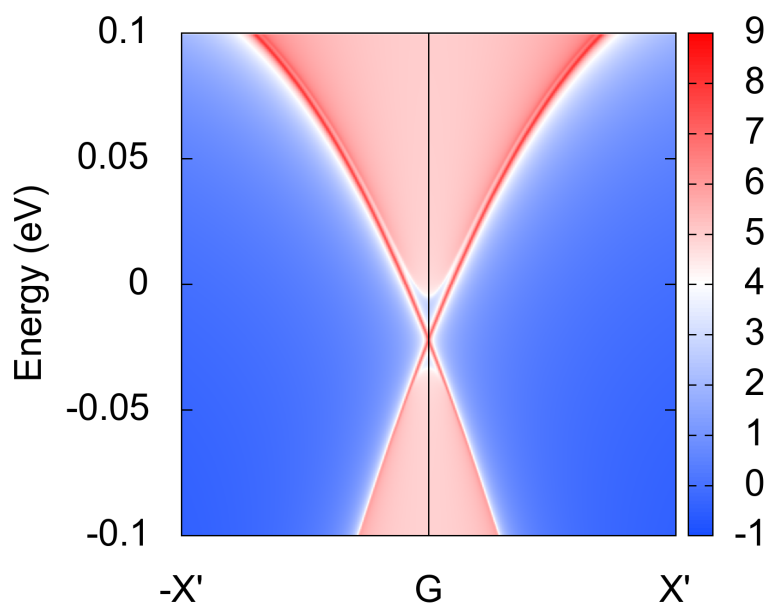


FIG. 2. (Color online) For VCCl₂ monolayer, topological helical edge states under 0.04 eV/Å electric field.

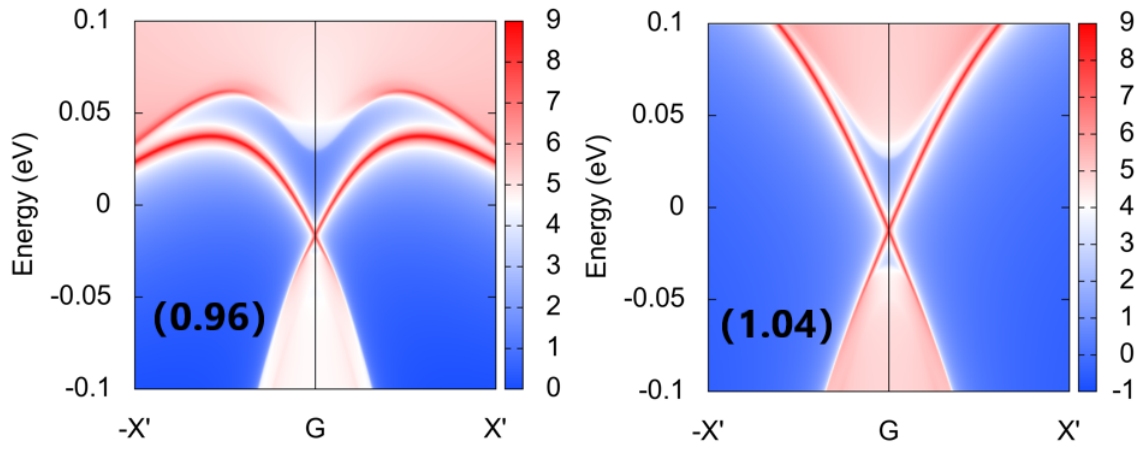


FIG. 3. (Color online) For VCClBr monolayer, topological helical edge states under 0.96 and 1.04 biaxial strains. The Fermi level has been shifted to the gap along Γ -Y path.

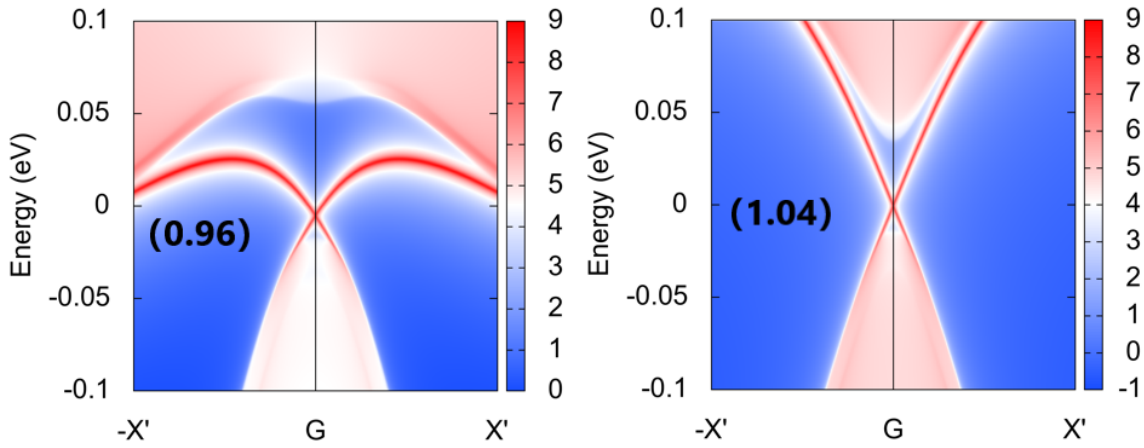


FIG. 4. (Color online) For VCClBr monolayer, topological helical edge states under 0.96 and 1.04 uniaxial- a strains. The Fermi level has been shifted to the gap along Γ -Y path.

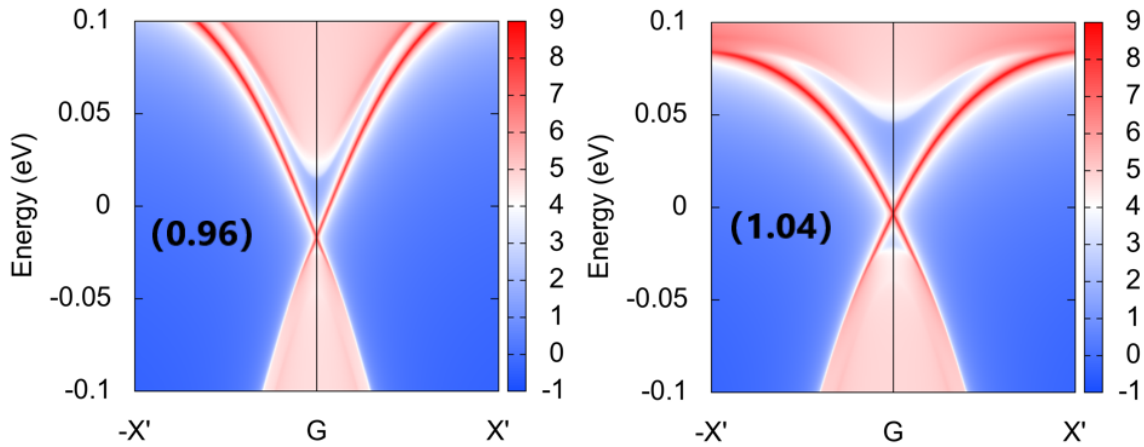


FIG. 5. (Color online) For VCClBr monolayer, topological helical edge states under 0.96 and 1.04 uniaxial- b strains. The Fermi level has been shifted to the gap along Γ -Y path.

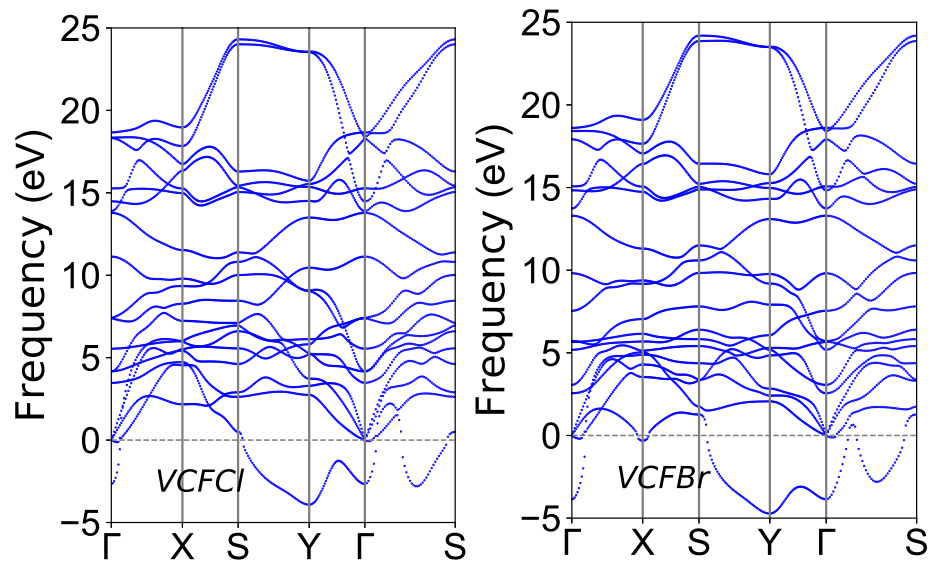


FIG. 6. (Color online) The phonon band dispersions of VCFC1 and VCFBr.