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Phase transition in $BaThO_3$ from *Pbnm* to *Ibmm* turn the fundamental energy band gap from indirect to direct

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1. The phase transition in BaTheO3 cause energy gap changes from indirect to direct.

2. The calculated energy gap is about 4.9 eV (*Pbnm*) and 4.6 eV (*Ibmm*)

3. The *Pbnm* and *Ibmm* phases exhibit negative uniaxial anisotropy and birefringence.

4. At room temperature $BaThO_3$ is stable in the *Pbnm* phase.

5. At room temperature $BaThO_3$ is stable in the *Ibmm* phase.