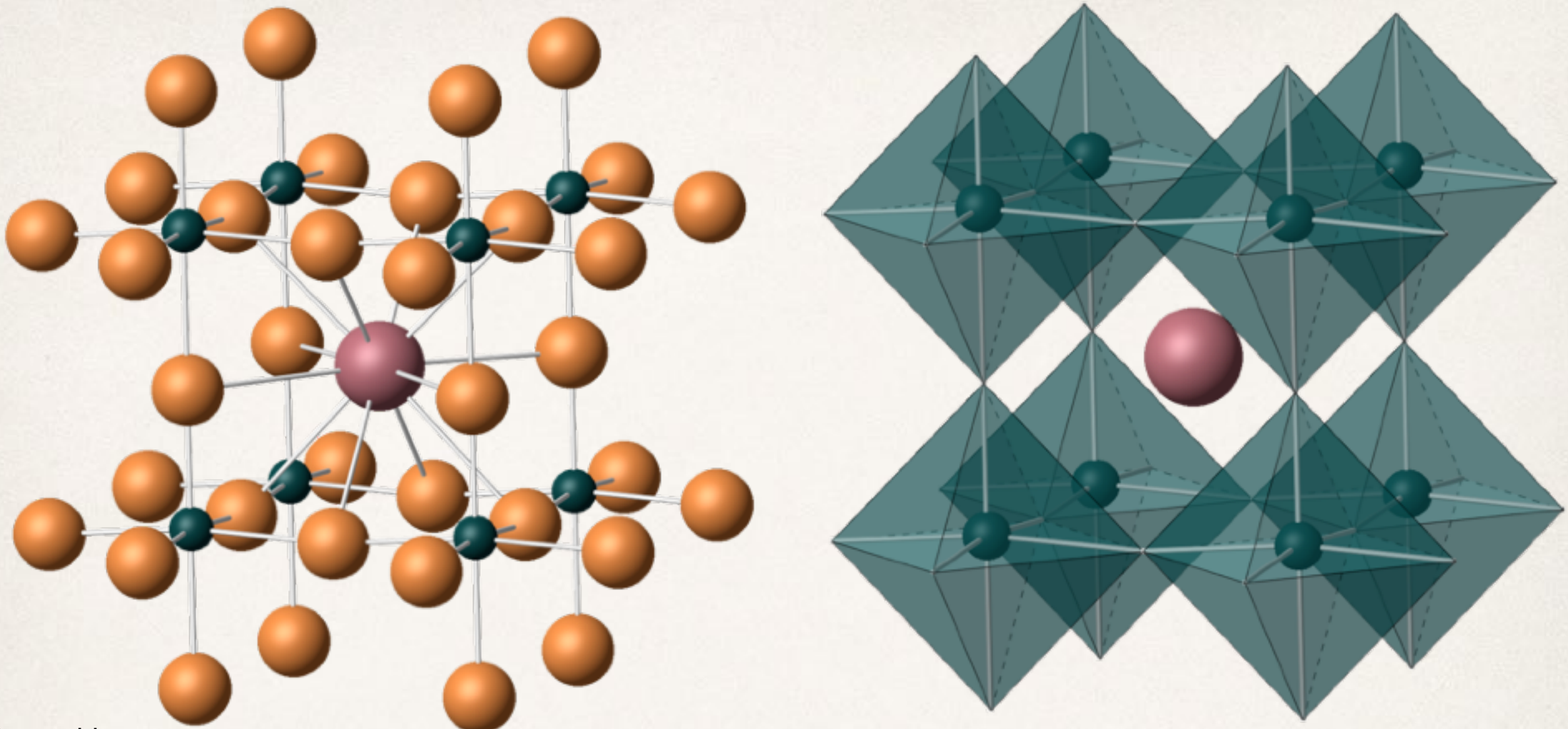
- A_2X_3 — corundum Al_2O_3, ilmenite $FeTiO_3$, perovskite $BaTiO_3$



Perovskite structure

Many A B X3 compounds adopt the perovskite structure, with A ions occupying large, 12-fold coordinated sites; B ions are in octahedral coordination by X.

The ideal perovskite structure has cubic symmetry, but the structure is remarkably flexible and can respond via octahedral tilts, or octahedral distortions (as in the case of $BaTiO_3$, described below).

Each titanium atom is bonded to six nearest neighbor oxygen atoms, but is not exactly in the center of an O_6 octahedron. This offset means that tetragonal $BaTiO_3$ is *ferroelectric*. The electrical polarization may be reversed by applying an external electric field.

Single crystals of $BaTiO_3$ generally contain many *domains*, corresponding to different directions of Ti off centering. The net effect of the different domain orientations is to cancel out any macroscopic polarization.