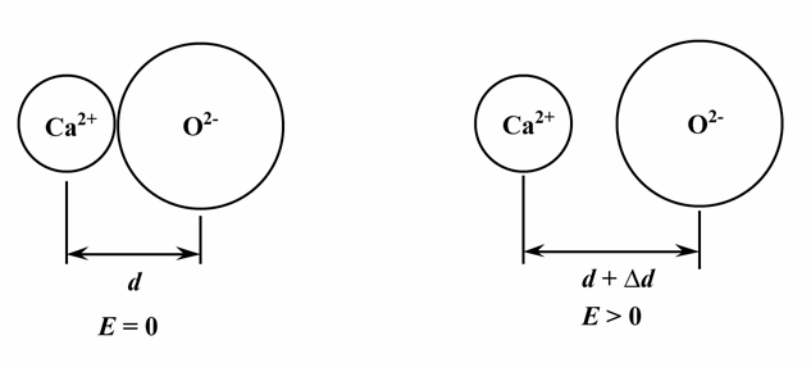
Field Vectors and Polarization

Types of Polarization

18.53 Shown below are the relative positions of Ca^{2+} and O^{2-} ions, without and with an electric field present.



Now,

$$d = r_{Ca^{2+}} + r_{O^{2-}} = 0.100 \text{ nm} + 0.140 \text{ nm} = 0.240 \text{ nm}$$

and

$$\Delta d = 0.05\, d = (0.05)(0.240 \text{ nm}) = 0.0120 \text{ nm} = 1.20 \times 10^{-11} \text{ m}$$

From Equation 18.28, the dipole moment, p, is just

$$p = q\,\Delta d$$

$$= (1.602 \times 10^{-19} \text{ C})(1.20 \times 10^{-11} \text{ m})$$

$$= 1.92 \times 10^{-30} \text{ C-m}$$