

12.9 This question is concerned with the corundum crystal structure in terms of close-packed planes of anions.

(a) For this crystal structure, two-thirds of the octahedral positions will be filled with  $\text{Al}^{3+}$  ions since there is one octahedral site per  $\text{O}^{2-}$  ion, and the ratio of  $\text{Al}^{3+}$  to  $\text{O}^{2-}$  ions is two-to-three.

(b) Two close-packed  $\text{O}^{2-}$  planes and the octahedral positions between these planes that will be filled with  $\text{Al}^{3+}$  ions are sketched below.

