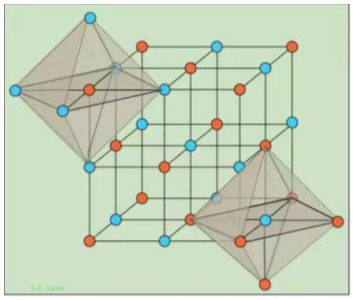
Answer on Question #55813 – Chemistry – General Chemistry

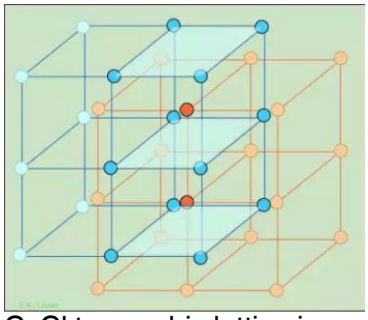
Question:

CsCl type cubic lattice can be transformed into rock salt type by applying :
(1) high pressure
(2) high temperature
(3) both (1) and (2)
(4) None of these

Answer:
Alkali halides that crystallize with the "rock-salt" structure exemplified by sodium chloride can be regarded either as a FCC (face-centered) structure of one kind of ion in which the octahedral holes are occupied by ions of opposite charge, or as two interpenetrating FCC lattices made up of the two kinds of ions. The two shaded octahedra illustrate the identical coordination of the two kinds of ions; each atom or ion of a given kind is surrounded by six of the opposite kind, resulting in a coordination expressed as (6:6).



CsCl is the common model for the BCC (body-centered) structure. As with so many other structures involving two different atoms or ions, we can regard the same basic structure in different ways. Thus if we look beyond a single unit cell, we see that CsCl can be represented as two interpenetrating simple cubic lattices in which each atom occupies an octahedral hole within the cubes of the other lattice.



CsCl type cubic lattice is more stable under high pressure, than NaCl type cubic lattice, but less stable under high temperature. **Thus CsCl type cubic lattice can be transformed into rock salt type by applying high temperature.**