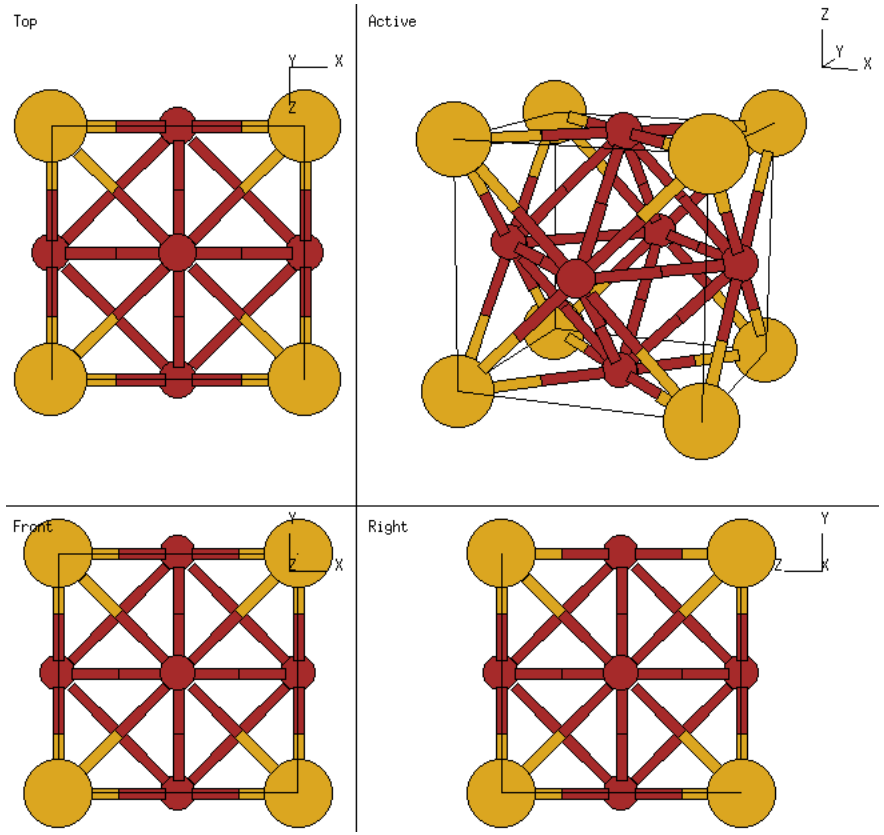
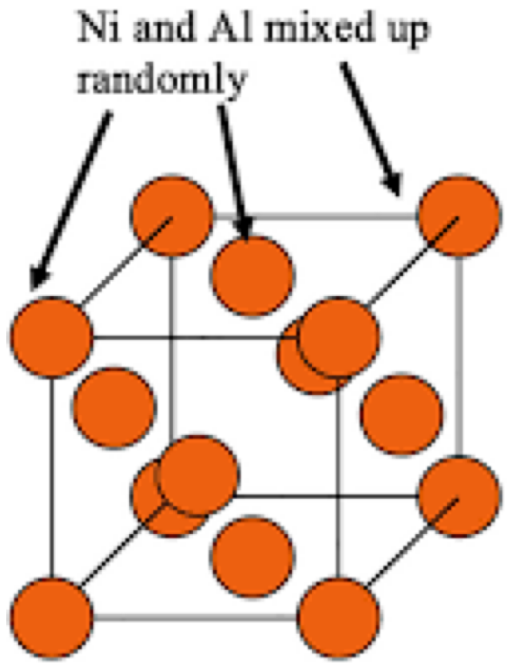
The Cu_3Au ($L1_2$) Structure


Top
Active
Front
Right


Ni and Al mixed up randomly

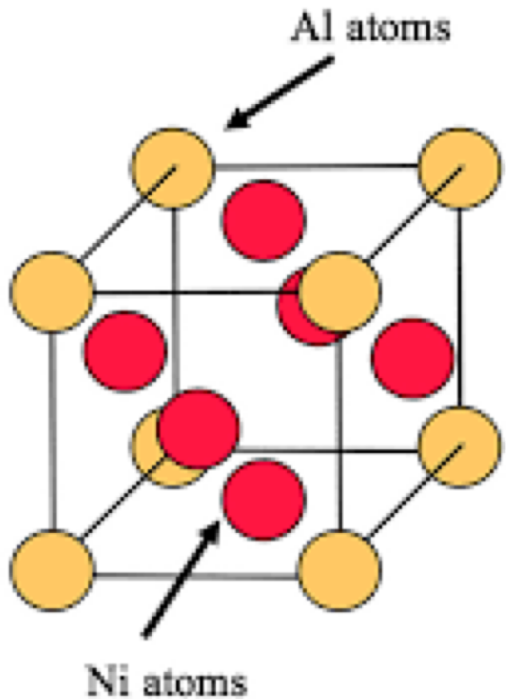

Al atoms
Ni atoms

Table 7.1. The Strukturbericht symbol, name, prototype, and Pearson symbol for a number of simple crystal structures and the Schoenflies and international notations for their space groups

Crystal structure		Proto-	Pearson	Symbols for	
Symbol	Name	type	symbol	the space group	
A1	face-centered cubic	Cu	cF4	O_h^5	$Fm\bar{3}m$
A2	body-centered cubic	W	cI2	O_h^9	$Im\bar{3}m$
A3	hexagonal close packed	Mg	hP2	D_{6h}^4	$P6_3/mmc$
A3′	double hexagonal close packed	La	hP4	D_{6h}^4	$P6_3/mmc$
A4	diamond	C	cF8	O_h^7	$Fd\bar{3}m$
A8	γ-selenium	Se	hP3	D_3^4	$P3_121$
A9	graphite	C	hP4	D_{6h}^4	$P6_3/mmc$
A15		Cr_3Si	cP8	O_h^3	$Pm\bar{3}n$
A_h	simple cubic	α-Po	cP1	O_h^1	$Pm\bar{3}m$
B1	sodium chloride	NaCl	cF8	O_h^5	$Fm\bar{3}m$
B2	cesium chloride	CsCl	cP2	O_h^1	$Pm\bar{3}m$
B3	sphalerite	ZnS	cF8	T_d^2	$F\bar{4}3m$
B4	wurtzite	ZnS	hP4	C_{6v}^4	$P6_3mc$
$B8_1$		NiAs	hP4	D_{6h}^4	$P6_3/mmc$
C1	fluorite	CaF_2	cF12	O_h^5	$Fm\bar{3}m$
C2	pyrite	FeS_2	cP12	T_h^6	$Pa\bar{3}$
C3	cuprite	Cu_2O	cP6	O_h^4	$Pn\bar{3}m$
C4	rutile	TiO_2	tP6	D_{4h}^{14}	$P4_2/mnm$
C14	Laves phase	$MgZn_2$	hP12	D_{6h}^4	$P6_3/mmc$
C15	Laves phase	Cu_2Mg	cF24	O_h^7	$Fd\bar{3}m$
$D0_2$	skutterudite	As_3Co	cI32	T_h^5	$Im\bar{3}$
$D0_3$		BiF_3	cF16	O_h^5	$Fm\bar{3}m$
$D0_9$		ReO_3	cP4	O_h^1	$Pm\bar{3}m$
$D2_f$		UB_{12}	cF52	O_h^5	$Fm\bar{3}m$
$D8_1$		Fe_3Zn_{10}	cI52	O_h^9	$Im\bar{3}m$
$E2_1$	perovskite	$CaTiO_3$	cP5	O_h^1	$Pm\bar{3}m$
$H1_1$	spinel	$MgAl_2O_4$	cF56	O_h^7	$Fd\bar{3}m$
$L1_0$		AuCu	tP2	D_{4h}^1	$P4/mmm$
$L1_2$		Cu_3Au	cP4	O_h^1	$Pm\bar{3}m$
$L2_1$	Heusler phase	$AlCu_2Mn$	cF16	O_h^5	$Fm\bar{3}m$
$L2_2$		Sb_2Tl_7	cI54	O_h^9	$Im\bar{3}m$
L′3		Fe_2N	hP3	D_{6h}^4	$P6_3/mmc$

The knowledge of the space group (the geometrical symmetries of the crystal) is not sufficient to reconstruct the structure of the crystal – i.e., the position of the atoms in the primitive cell – unambiguously. Different ways of decorating the primitive cell may lead to the same space group. This means that the number of structure types is expected to be much higher than the number of space groups.

Even though, about one-third of the elements are crystallized in one of four structures: cI2 and cF4 of the cubic system and hP2 and hP4 of the hexagonal system.