Table 9.1.1.2. *Examples for sphere packings with high contact numbers and high densities and with low contact numbers and low densities*

Type	k	Symmetry			Parameters	Distance d	Net	Stacking	Density
1	12	$P6_3/mmc$	$2(c)$	$\frac{1}{3},\frac{2}{3},\frac{1}{4}$	$c/a=\frac{2}{3}\sqrt{6}$	a	(001) 3^6	3, 3 2	0.7405
2	12	$Fm\bar{3}m$	$4(a)$	0, 0, 0	–	$\frac{1}{2}\sqrt{2}a$	{111} 3^6 {001} 4^4	3, 3 3 4, 4 2	
3	11	$Cmca$	$8(f)$	$0,y,z$	$y=\frac{1}{6}, z=\frac{3}{2}\sqrt{2}-2$ $b/a=\sqrt{3}, c/a=\frac{2}{3}\sqrt{6}+\sqrt{3}$	a	(001) 3^6	3, 2 4	0.7187
4	11	$P3_121$	$6(c)$	x,y,z	$x=\frac{1}{2}, y=\frac{5}{6}, z=\sqrt{2}-\frac{4}{3}$ $c/a=\sqrt{6}+\frac{3}{2}\sqrt{3}$	a	(001) 3^6	3, 2 6	
5	11	$Fdd2$	$16(b)$	x,y,z	$x=\frac{1}{6}, y=\frac{3}{4}\sqrt{2}-1, z=0$ $b/a=\frac{4}{3}\sqrt{2}+2, c/a=\frac{1}{3}\sqrt{3}$	c	(010) 3^6	3, 2 8	
6	11	$P6_522$	$12(c)$	x,y,z	$x=\frac{1}{6}, y=\frac{1}{3}, z=\frac{1}{2}\sqrt{2}-\frac{2}{3}$ $c/a=2\sqrt{6}+3\sqrt{3}$	a	(001) 3^6	3, 2 12	
7	11	$C2/m$	$4(i)$	$x,0,z$	$x=\frac{1}{2}\sqrt{2}-\frac{1}{2}, z=3\sqrt{2}-4$ $b/a=\frac{1}{3}\sqrt{3}, c/a=\frac{1}{6}\sqrt{6}+\frac{1}{3}\sqrt{3}$ $\cos\beta=\frac{1}{6}\sqrt{6}-\frac{1}{3}\sqrt{3}$	b	(001) 3^6	3, 2 12	
8	11	$P4_2/mnm$	$4(f)$	$x,x,0$	$x=\frac{1}{2}\sqrt{2}-\frac{1}{2}, c/a=2-\sqrt{2}$	c	–	–	0.7187
9	10	$I4/mmm$	$2(a)$	0, 0, 0	$c/a=\frac{1}{3}\sqrt{6}$	c	{110} 3^6	2, 2 2	0.6981
10	10	$P6_222$	$3(c)$	$\frac{1}{2}$, 0, 0	$c/a=\frac{3}{2}\sqrt{3}$	a	(001) 3^6	2, 2 3	
11	10	$Fddd$	$8(a)$	0, 0, 0	$b/a=\sqrt{3}, c/a=2\sqrt{3}$	a	(001) 3^6	2, 2 4	
12	10	$Fddd$	$16(g)$	$\frac{1}{8},\frac{1}{8},z$	$z=\frac{5}{16}, b/a=\sqrt{3}, c/a=4\sqrt{3}$	a	(001) 3^6	2, 2 8	
13	10	$Cmcm$	$4(c)$	$0,y,\frac{1}{4}$	$y=\frac{3}{10}, b/a=\frac{1}{3}\sqrt{15}, c/a=\frac{2}{5}\sqrt{10}$	$\frac{1}{3}\sqrt{6}a$	(001) 4^4	3, 3 2	0.6981
14	10	$Pnma$	$4(c)$	$x.\frac{1}{4},z$	$x=\frac{7}{20}, z-\frac{7}{8}, b/a=\frac{4}{5}, c/a=\frac{2}{15}\sqrt{15}$	c	(010) 4^4	3, 3 2	
15	10	$P6_3/mmc$	$4(f)$	$\frac{1}{3},\frac{2}{3},z$	$z=\frac{3}{4}-\frac{1}{4}\sqrt{6}, c/a=\frac{2}{3}\sqrt{6}+2$	a	(001) 3^6	3, 1 4	0.6657
16	10	$R\bar{3}m$	$6(c)$	$0,0,z$	$z=\frac{1}{2}-\frac{1}{6}\sqrt{6}, c/a=\sqrt{6}+3$	a	(001) 3^6	3, 1 6	
17	10	$Cmcm$	$4(c)$	$0,y,\frac{1}{4}$	$y=\frac{3}{4}-\frac{1}{4}\sqrt{6}$, $c/a=1, b/a=\sqrt{3}+\sqrt{2}$	a	(010) 4^4	4, 2 4	0.6657
18	10	$I4_1/amd$	$8(e)$	$0,0,z$	$z=\frac{1}{2}-\frac{1}{8}\sqrt{6}, c/a=2\sqrt{3}+2\sqrt{2}$	a	(001) 4^4	4, 2 8	
19	10	$I4/m$	$8(h)$	$x,y,0$	$x=\frac{6}{17}-\frac{1}{17}\sqrt{2}, y=\frac{7}{17}-\frac{4}{17}\sqrt{2}$ $c/a=(\frac{14}{17}-\frac{8}{17}\sqrt{2})^{1/2}$	c	–	–	0.6619
20	10	$R\bar{3}$	$18(f)$	x,y,z	$x=\frac{3}{7}, y=\frac{1}{7}, z=0, c/a=\frac{1}{7}\sqrt{42}$	$\frac{1}{7}\sqrt{7}a$	(001) 3^46	3, 2 3	0.6347
21	4	$Fd\bar{3}m$	$32(e)$	x,x,x	$x=\frac{3}{8}-\frac{1}{8}\sqrt{6}$	$(\frac{3}{4}\sqrt{2}-\frac{1}{2}\sqrt{3})a$	–	–	0.1235
22	4	$Im\bar{3}m$	$48(j)$	$0,y,z$	$y=\frac{4}{7}-\frac{3}{28}\sqrt{2}, z=\frac{5}{14}-\frac{1}{28}\sqrt{2}$	$(\frac{3}{14}\sqrt{2}-\frac{1}{7})a$	–	–	0.1033
23	4	$I4_132$	$48(i)$	x,y,z	$x=y=\frac{1}{8}\sqrt{2}, z=0$	$(\frac{1}{2}-\frac{1}{4}\sqrt{2})a$	–	–	0.0789
24	3	$I4_132$	$24(h)$	$\frac{1}{8},y,\frac{1}{4}-y$	$y=\frac{1}{4}\sqrt{3}-\frac{3}{8}$	$(\frac{1}{2}\sqrt{6}-\frac{3}{4}\sqrt{2})a$	–	–	0.0555

references