Semiconductor crystals composed of two atom CFUs

Robert William Whitby
27 August 2005
http://homepage.mac.com/whitby/
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http://web.me.com/whitby/Octahedron/Welcome.html

References

1. Octahedron, the Universe defined by Robert William Whitby

A description of the atomic shapes and how they join which follows from the discovery that the periodicity of the atomic elements matches the periodicity of recurring form in which identical regular octahedra combine to form ever larger regular octahedra. Octahedron1stEd.pdf shows that the atomic elements are crystalline assemblies of identical regular octahedra and explores the implications of this discovery. 500 pages
See the chapter CRYSTAL.
http://homepage.mac.com/whitby/FileSharing103.html

2. Tetrapod structure by Robert William Whitby

Shows how a Zn-atom and an O-atom can join to form a Sr-atom homomorph. The ZnO-group can join with identical groups to form the tetrahedral structure which is called a *tetrapod*.
http://homepage.mac.com/whitby/Crystals/FileSharing215.html

3. Mn-atom doping of 100-planes of ZnSe crystal by Robert William Whitby

This document shows the atoms, the formation of the ZnSe-group, a crystalline assembly of identical ZnSe-groups, and the ways in which a Mn-atom can join to each of the crystal surfaces that are parallel to one of the three mutually perpendicular planes. It shows how a Mn-atom can join with the ZnSe-groups which define each of the two types of 100-plane. It also shows that two Ge-atoms can join as a unit which is a homomorph of the ZnSe-group.
http://homepage.mac.com/whitby/Crystals/FileSharing217.html

Introduction

The pairing of elements in both elemental and compound semiconductors are identical in their ability to join so that their joining He-octas and triplets are arranged as a square layer of four He-octas. This paper shows each such pairing in both a vertexial view and a facial view and shows four identical pairs joined in a crystalline layer.
There are three types of pairings–

One plus three–Each of these groups is formed by one element supplying one He-octa and the other element supplying three He-octas to a joint layer of four He-octas in a square array.

One and a half plus two and a half–Each of these groups is formed by one element supplying one He-octa and a triplet and the other element supplying two He-octas and a triplet to a joint layer of four He-octas in a square array.

Two plus two–Each of these groups is formed by each element supplying two He-octas to a joint layer of four He-octas in a square layer.

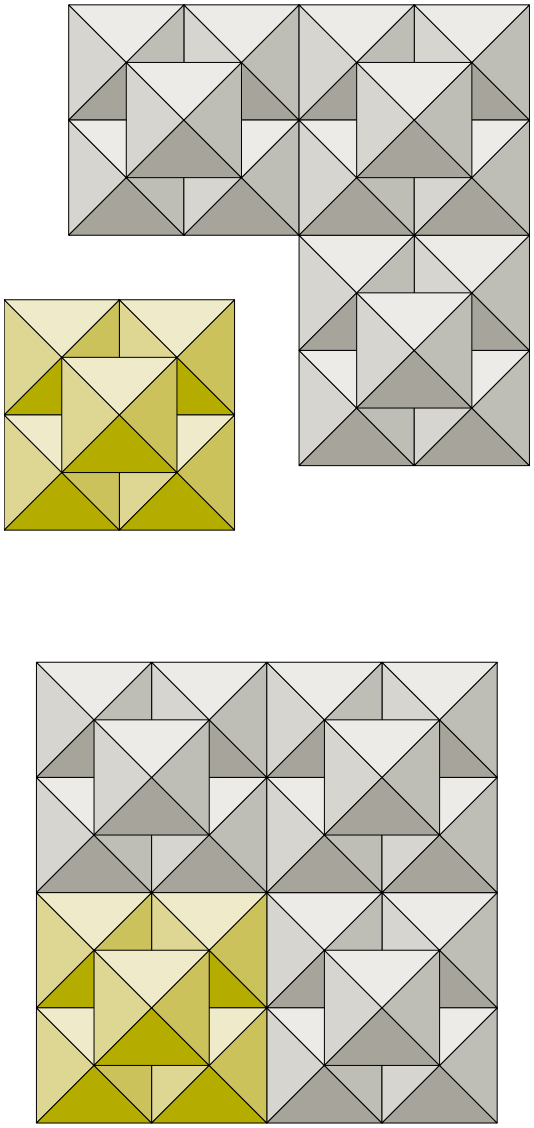

Fig. 1 One plus three–layer

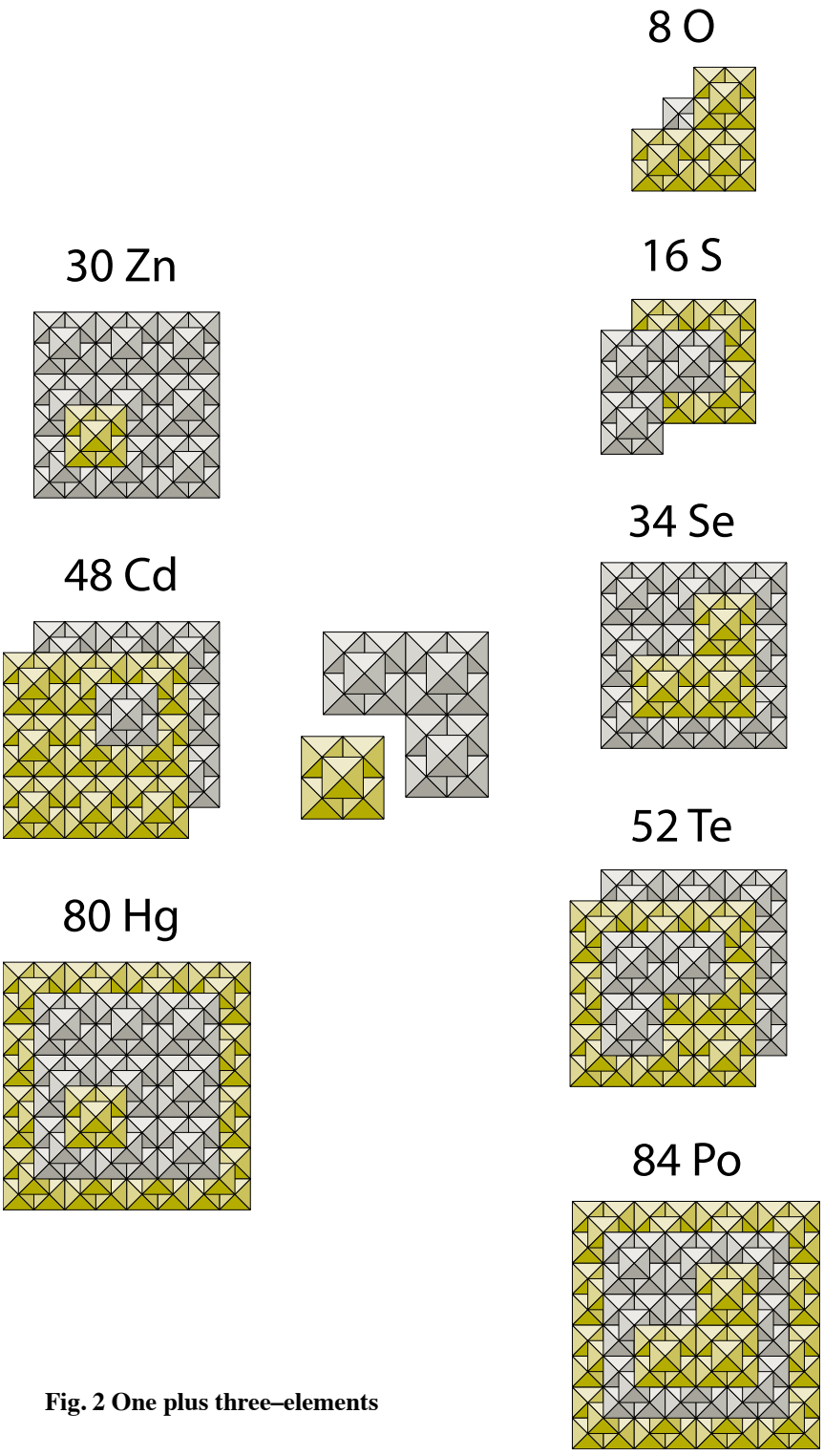

Fig. 2 One plus three–elements

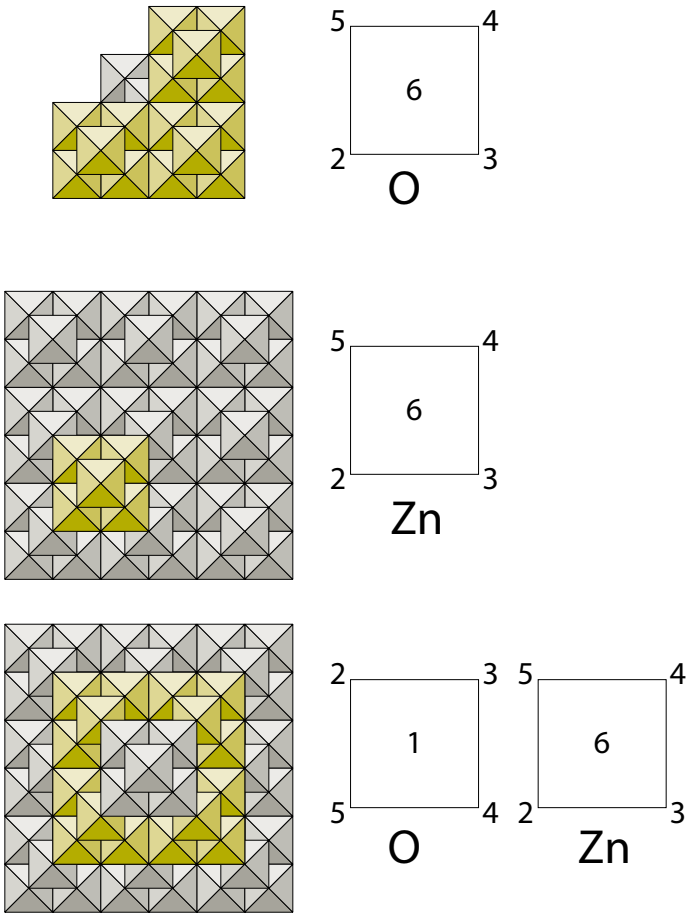

Fig. 3 ZnO-group
The ZnO-group is a Sr-atom homomorph.

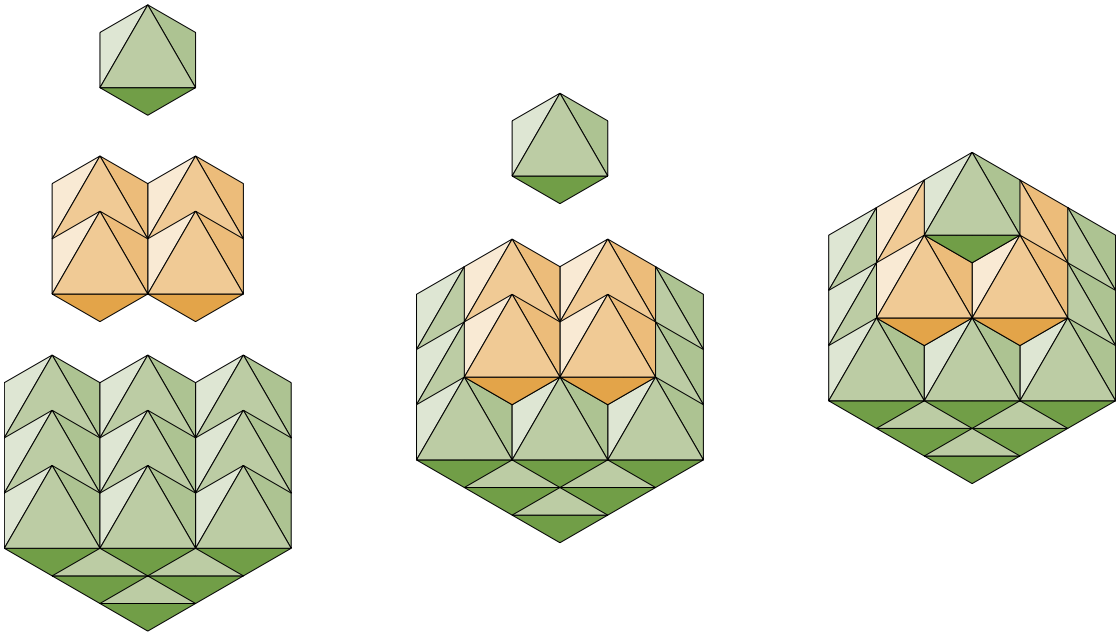

Fig. 4 ZnO-group facial

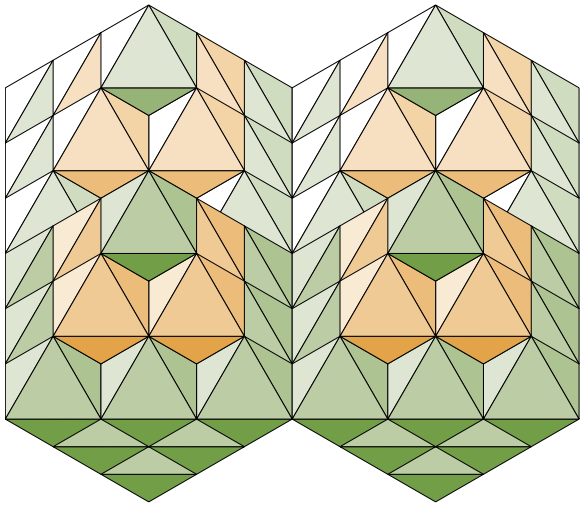

Fig. 5 ZnO-crystal plane

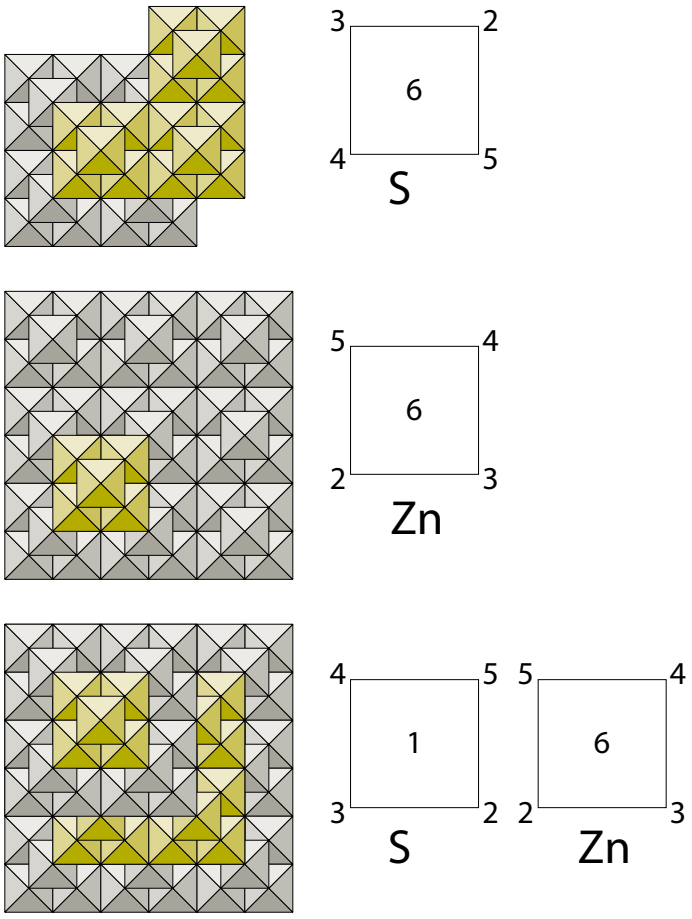

Fig. 6 ZnS-group

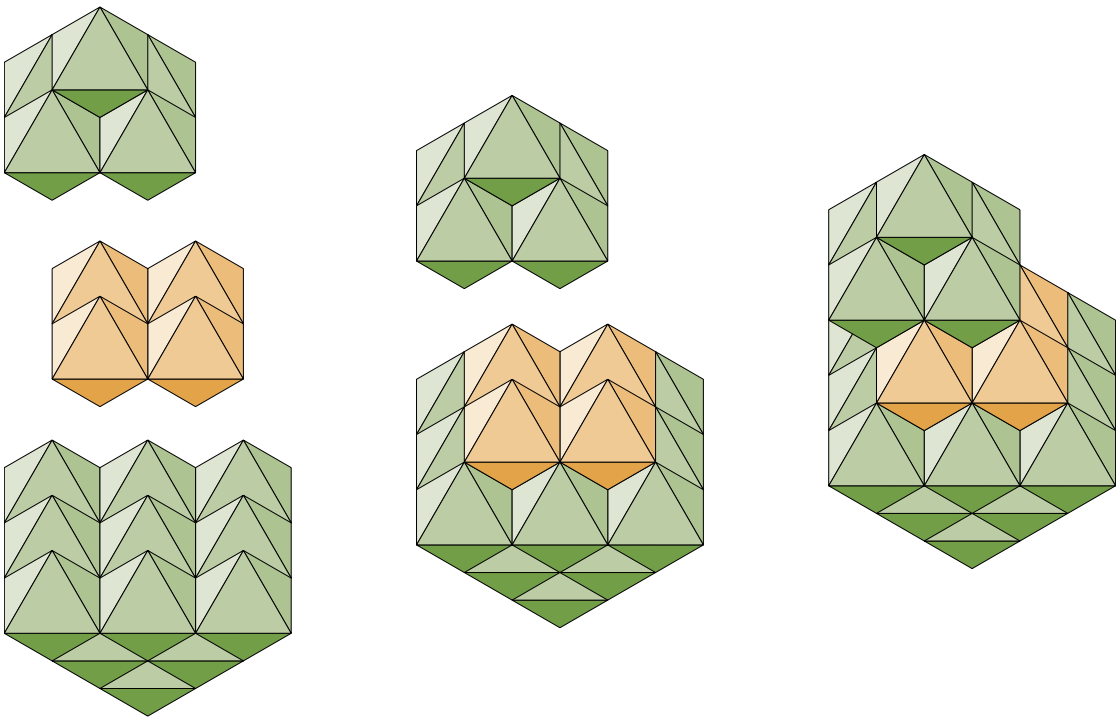

Fig. 7 ZnS-group facial

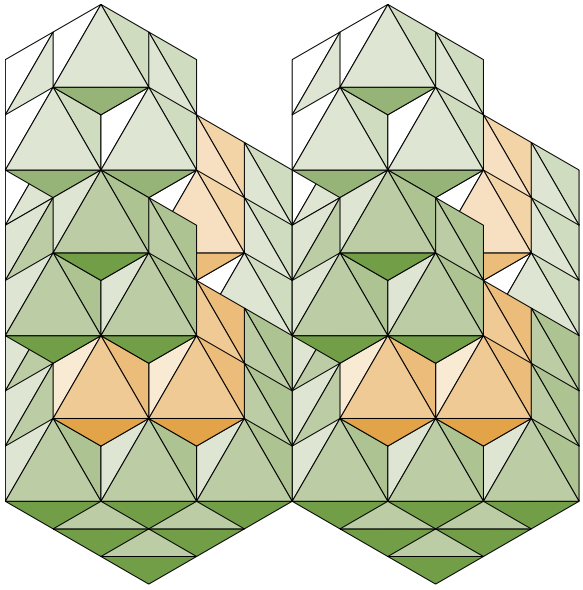

Fig. 8 ZnS-crystal layer

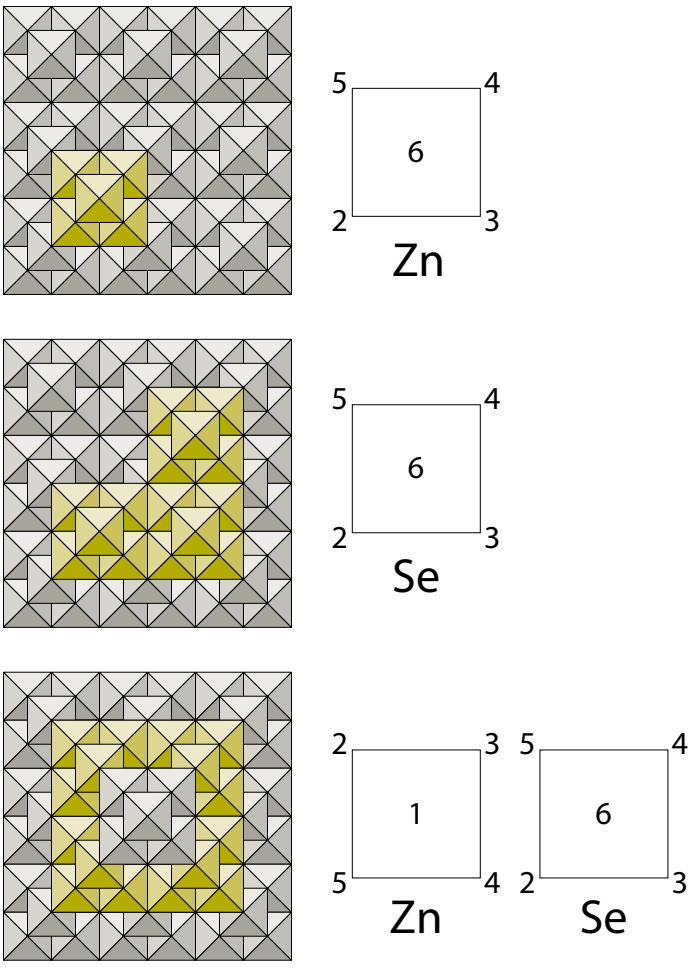

Fig. 9 ZnSe-group

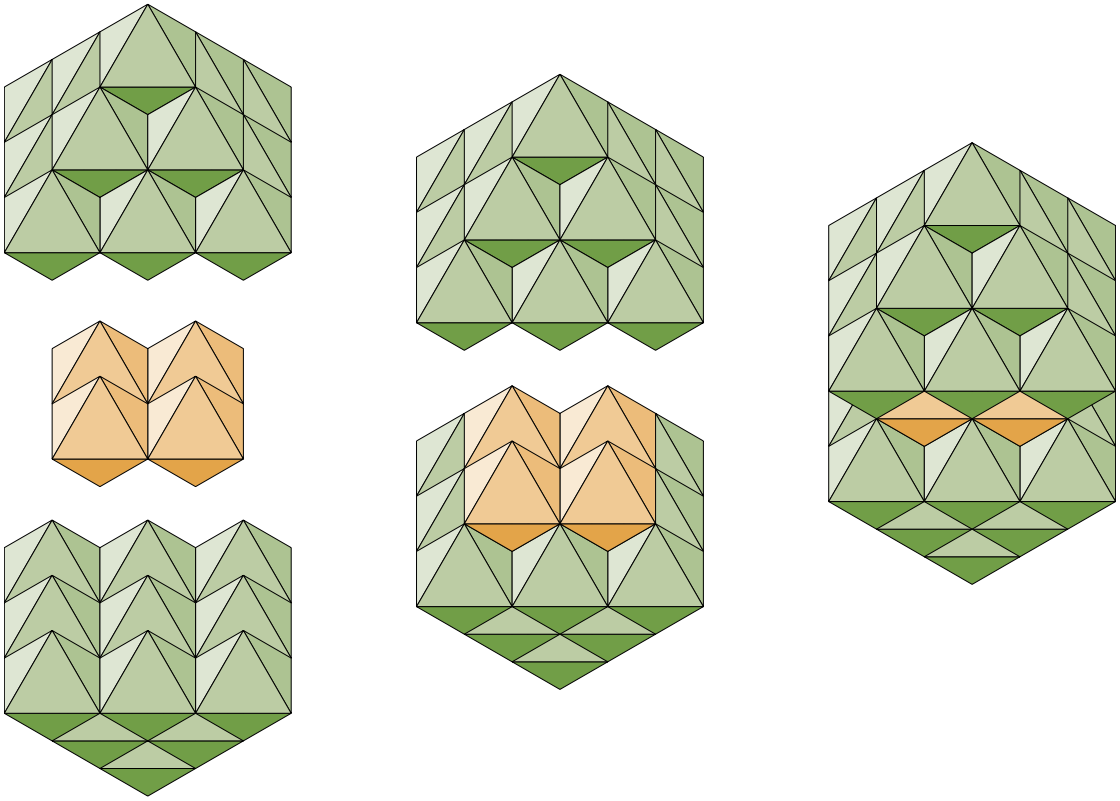

Fig. 10 ZnSe-group facial

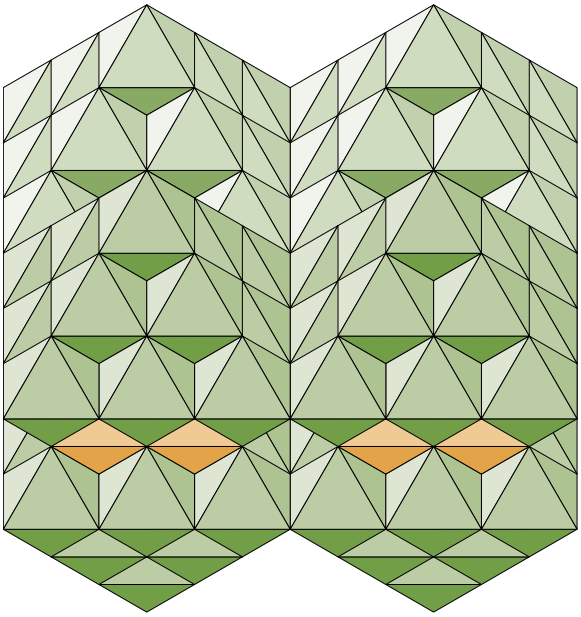

Fig. 11 ZnSe crystal plane

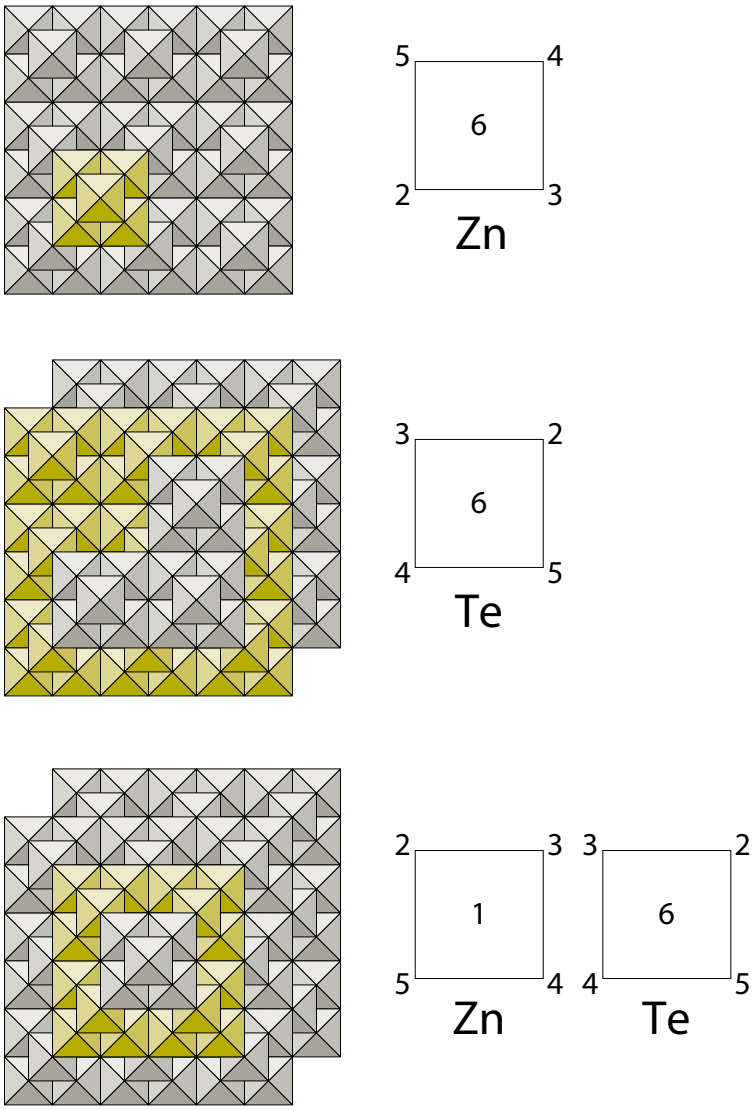

Fig. 12 ZnTe-group

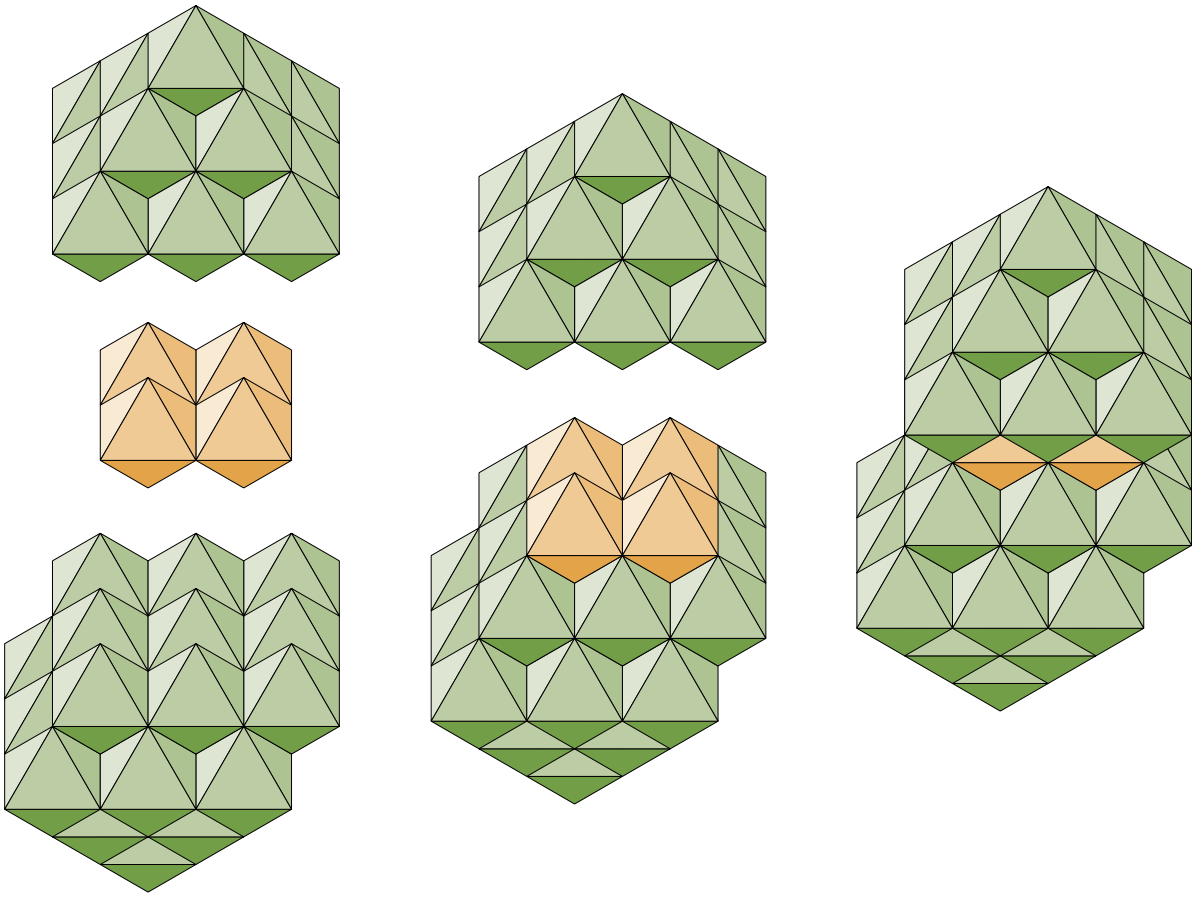

Fig. 13 ZnTe-group facial

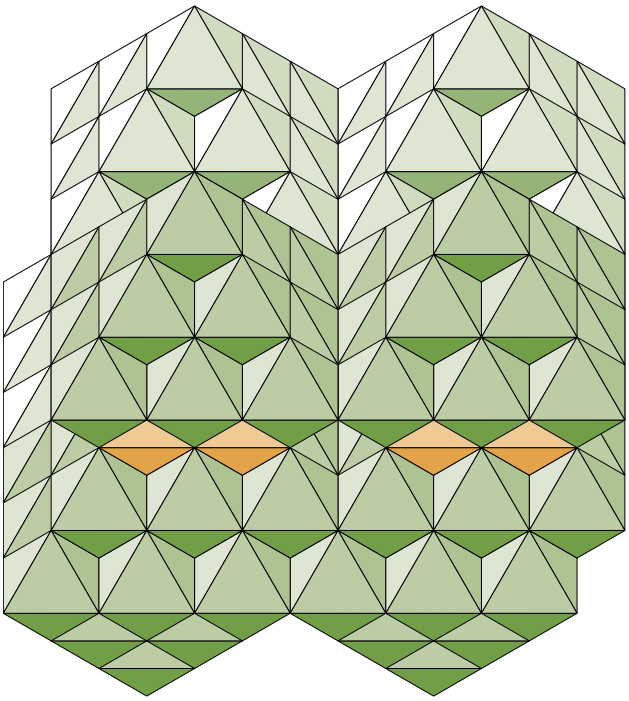

Fig. 14 ZnTe-crystal plane

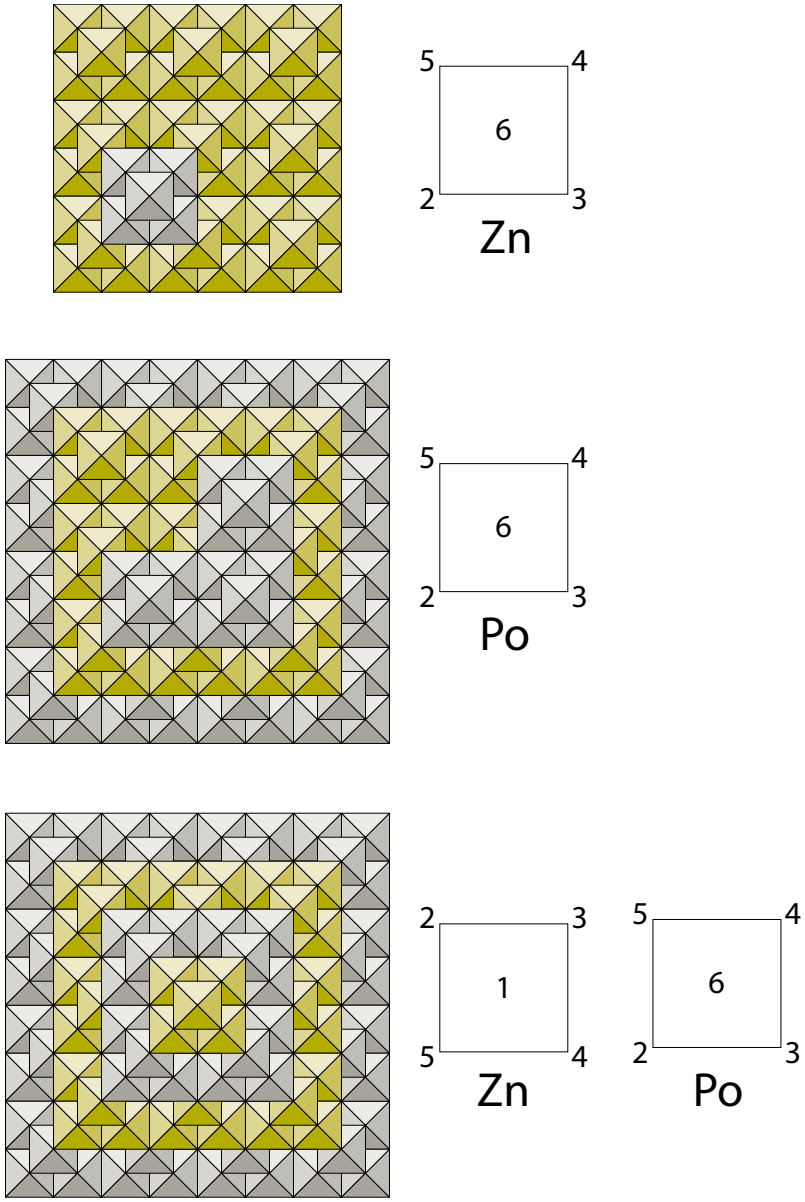

Fig. 15 ZnPo-group

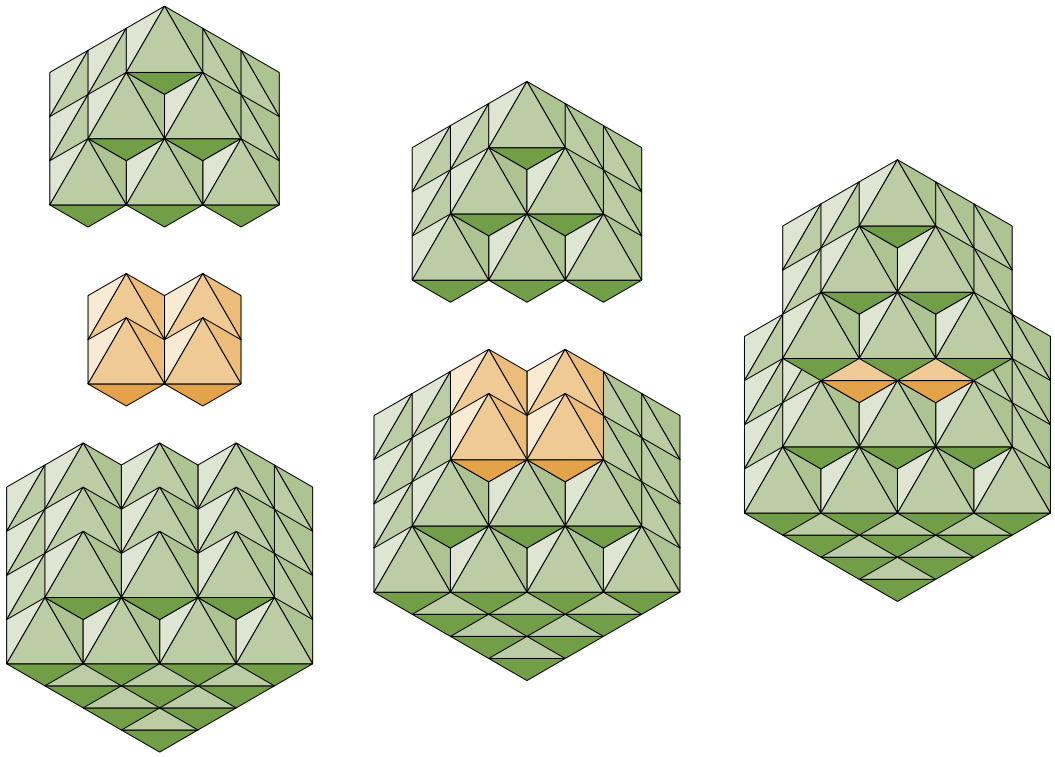

Fig. 16 ZnPo-group facial

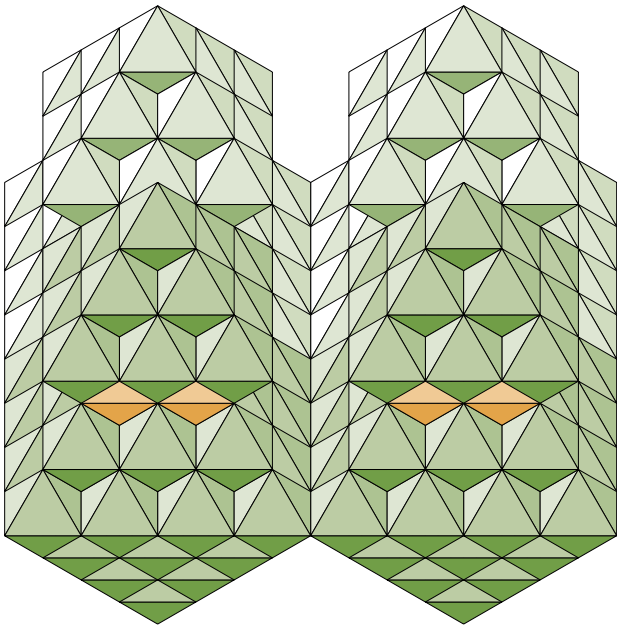

Fig. 17 ZnPo-crystal layer

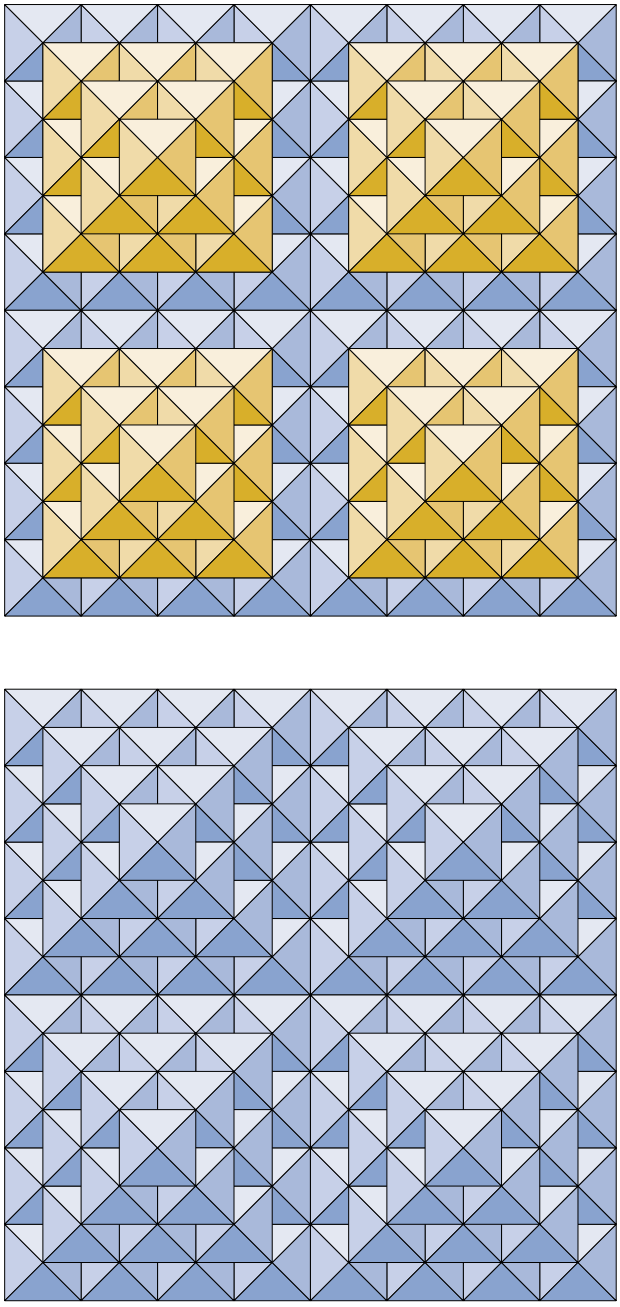

Fig. 18 ZnPo-crystal–intralayer joining

The figure shows a vertexial layer ZnPo-groups from opposite viewing directions.

At the top, the orange Zn-atoms have the spacing of 4-octas but the form of 3-octas.

At the bottom, the blue Po-atoms have the form of 4-octas. Each of the Po-atoms is joined edge to edge to four adjoining Po-atoms.

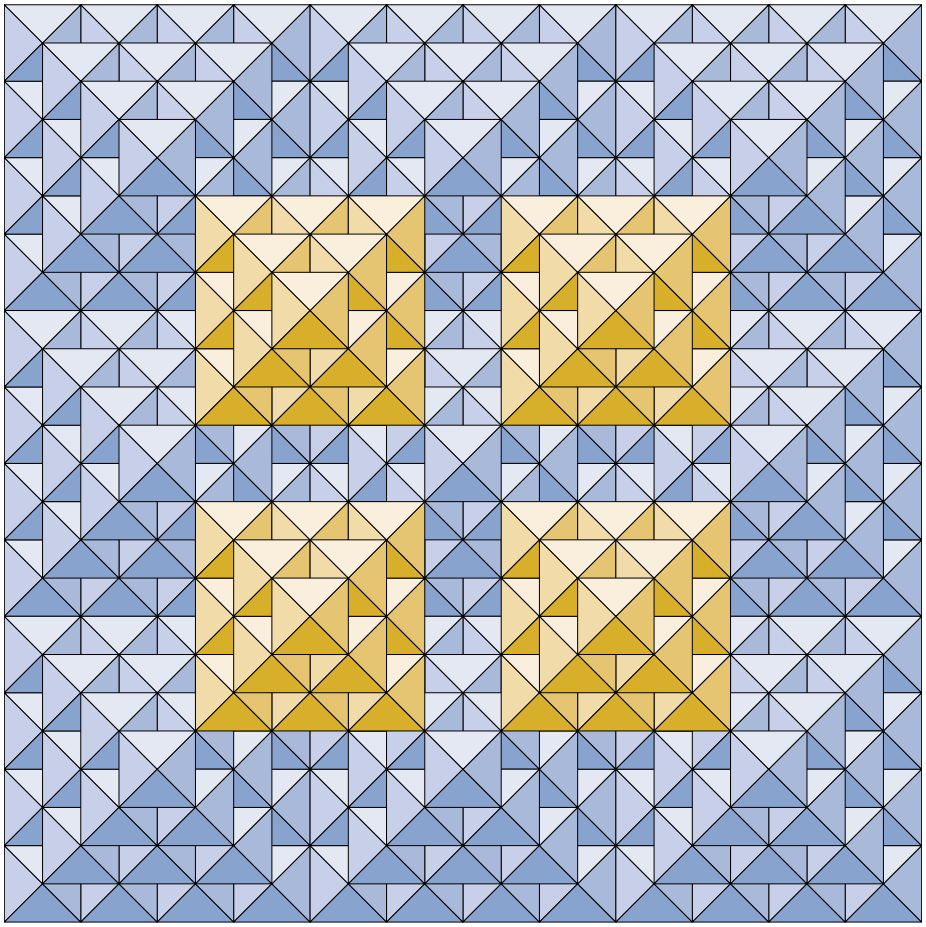

Fig. 19 ZnPo-crystal–layer to layer joining

The figure shows how the Zn-atoms of one layer join with the Po-atoms of an adjoining layer. The orange 3-octas represent the Zn-atoms; the blue 4-octas represent the Po-atoms.A vertex of each Zn-atom is congruent with a vertex of four Po-atoms. The three He-octas along each of the four edges of the Zn-atom which meet at the common vertex are joined to three He-octas of one of the four Zn-atoms.

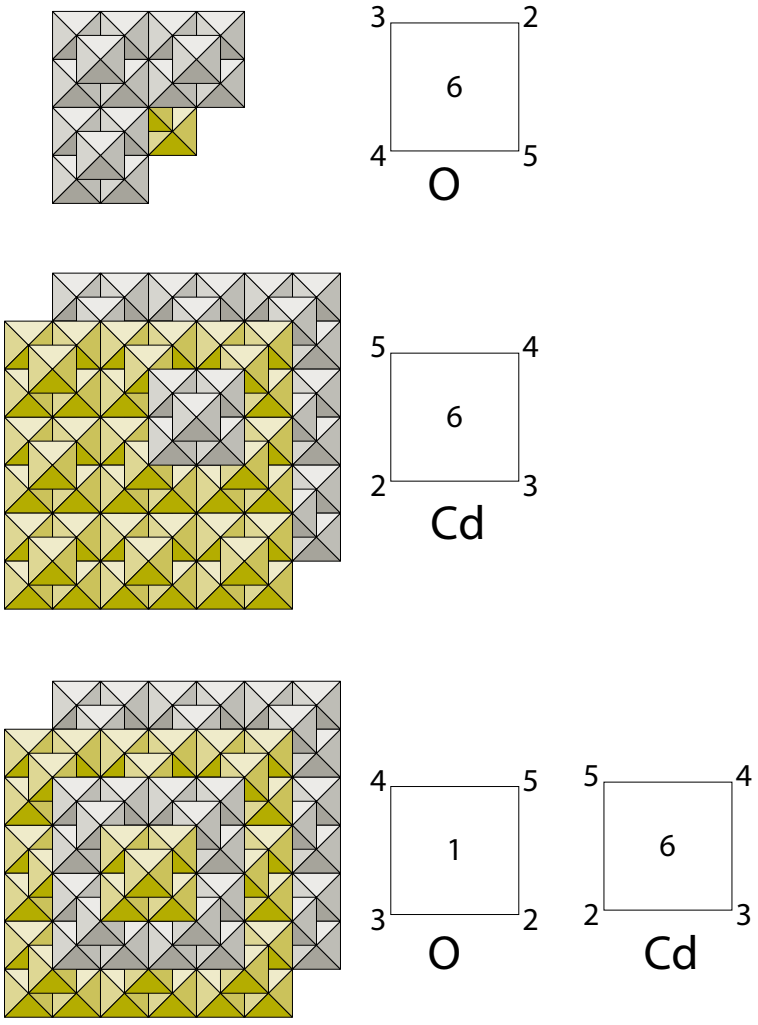

Fig. 20 CdO-group

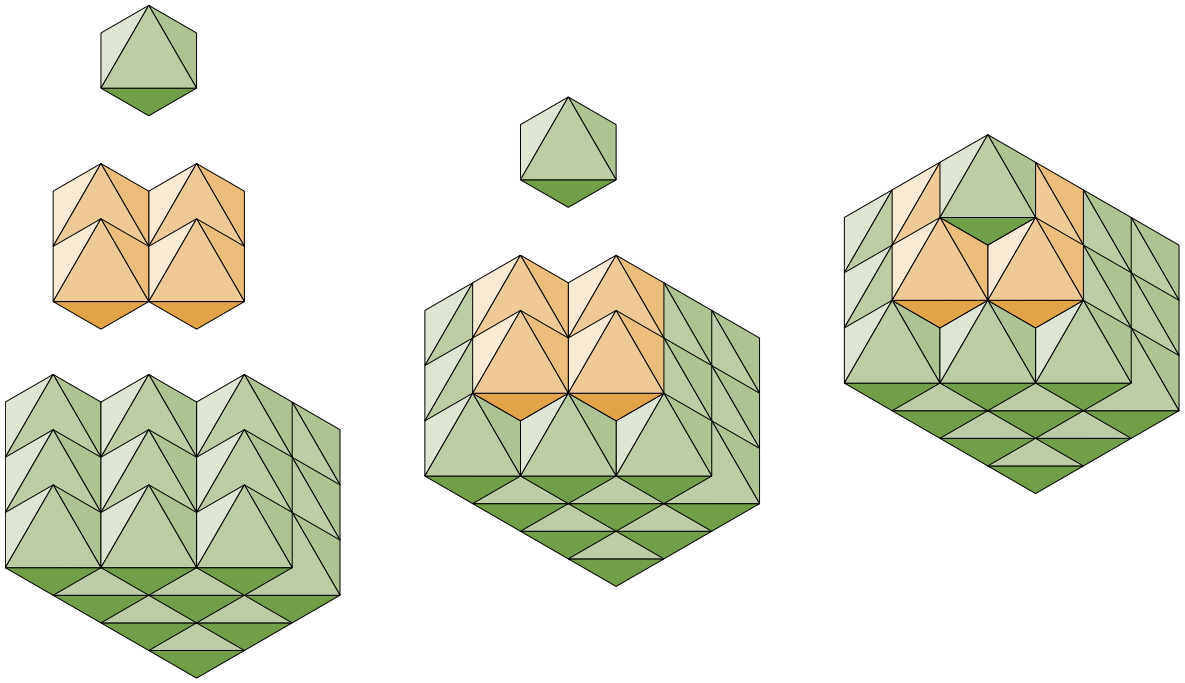

Fig. 21 CdO-group facial

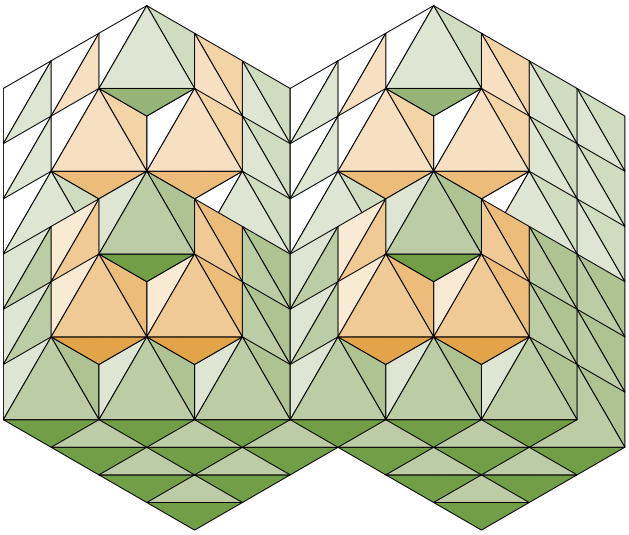

Fig. 22 CdO-crystal layer

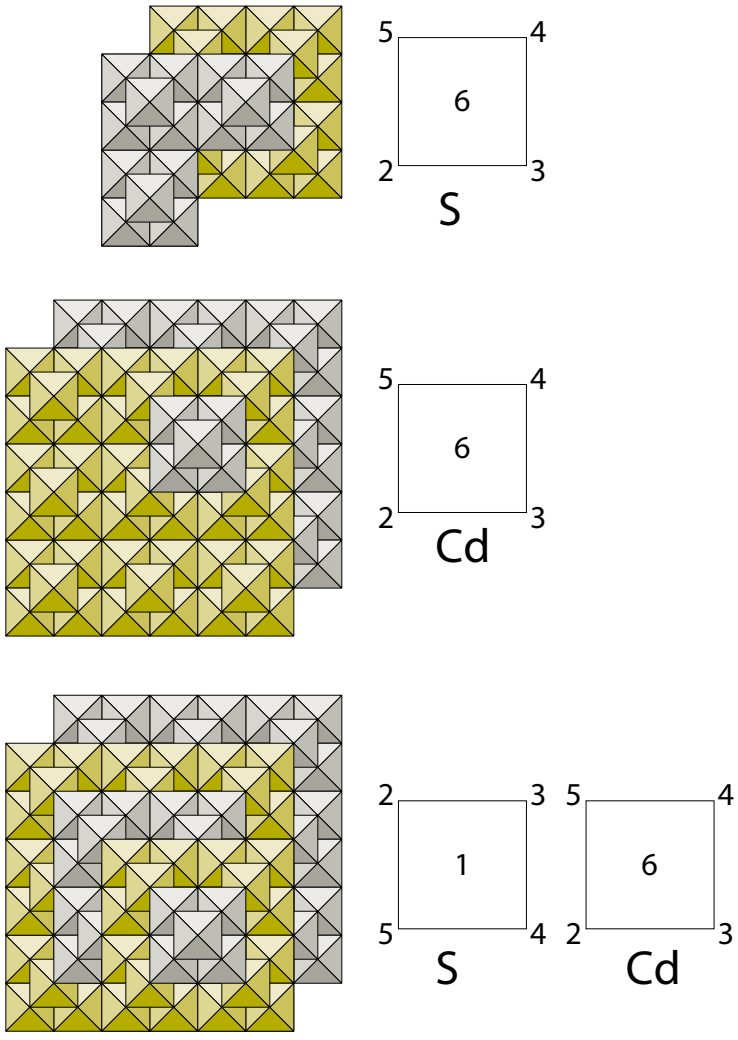

Fig. 23 CdS-group

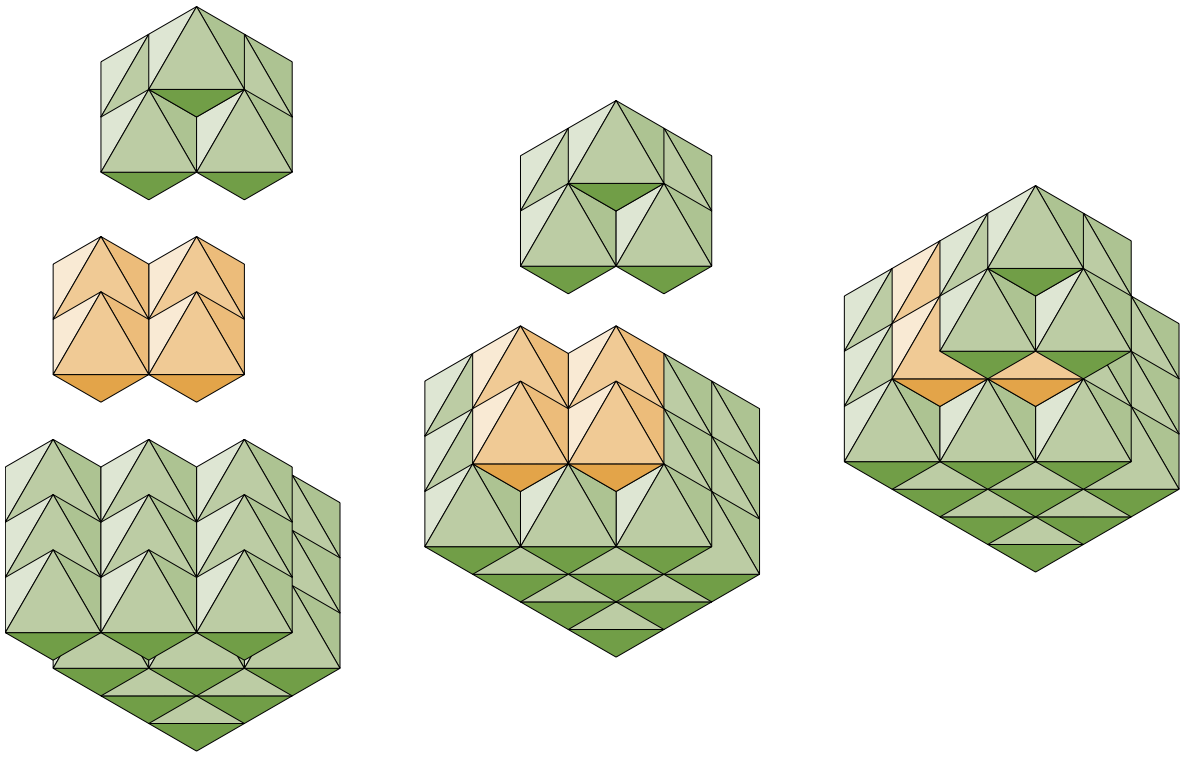

Fig. 24 CdS-group facial

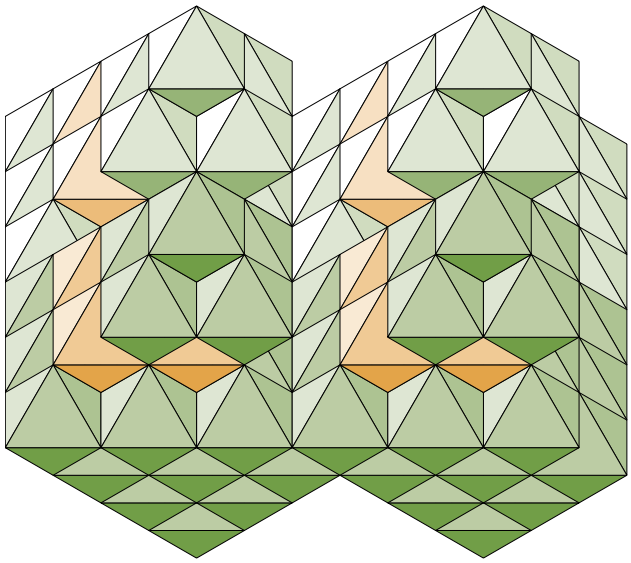

Fig. 25 CdS-crystal layer

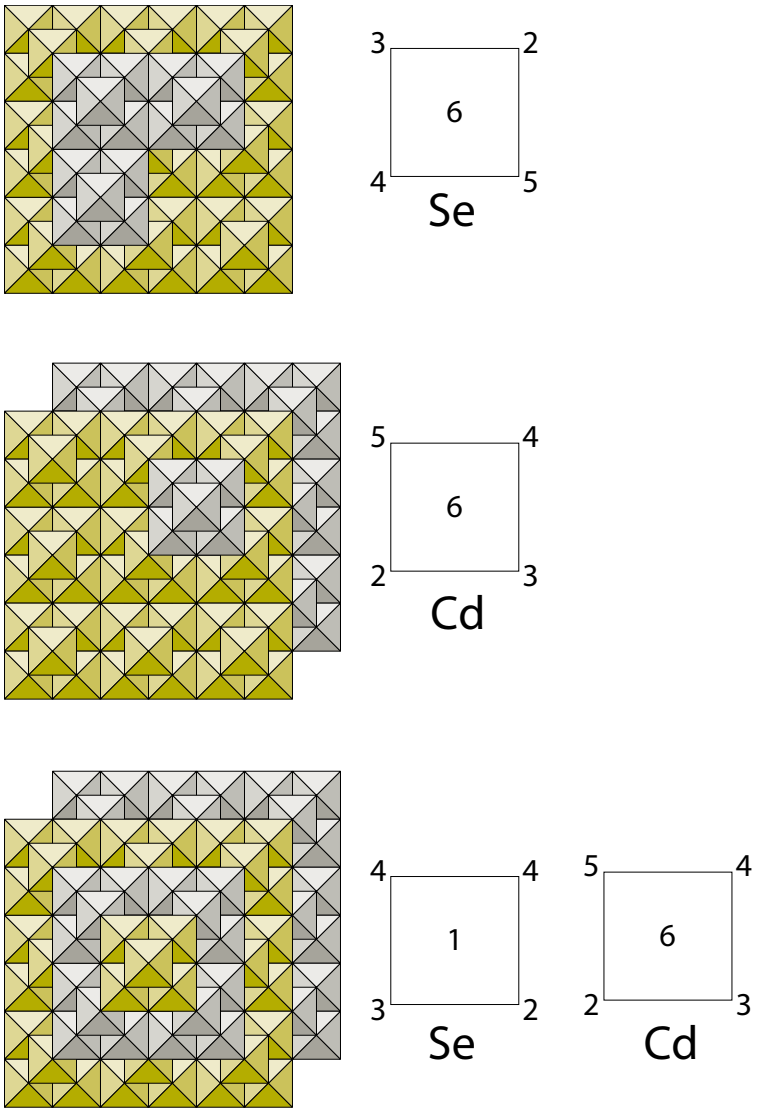

Fig. 26 CdSe-group

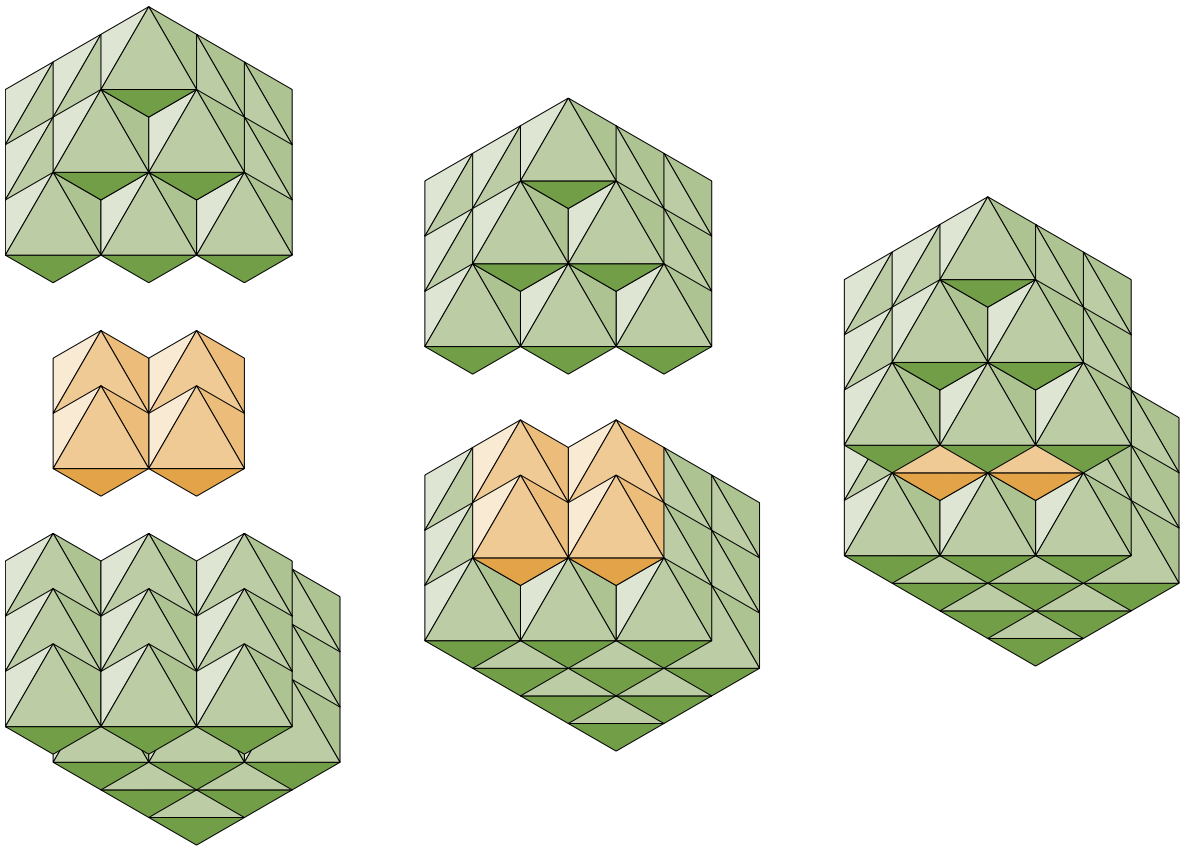

Fig. 27 CdSe-group facial

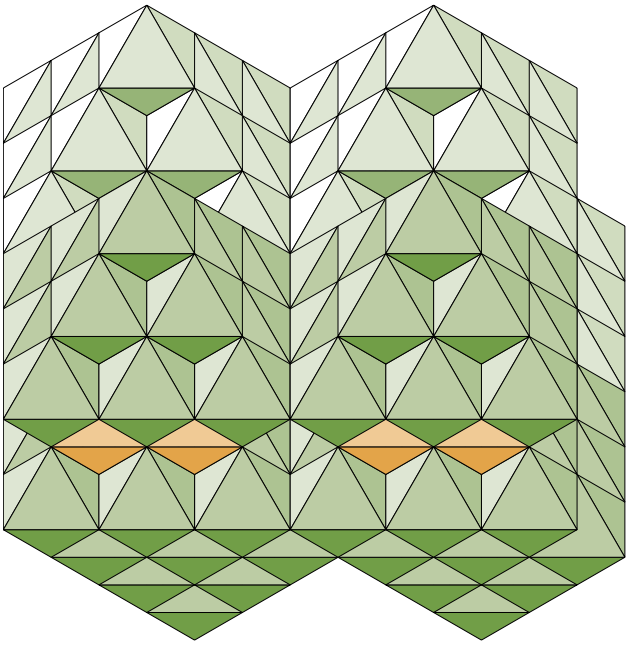

Fig. 28 CdSe-crystal layer

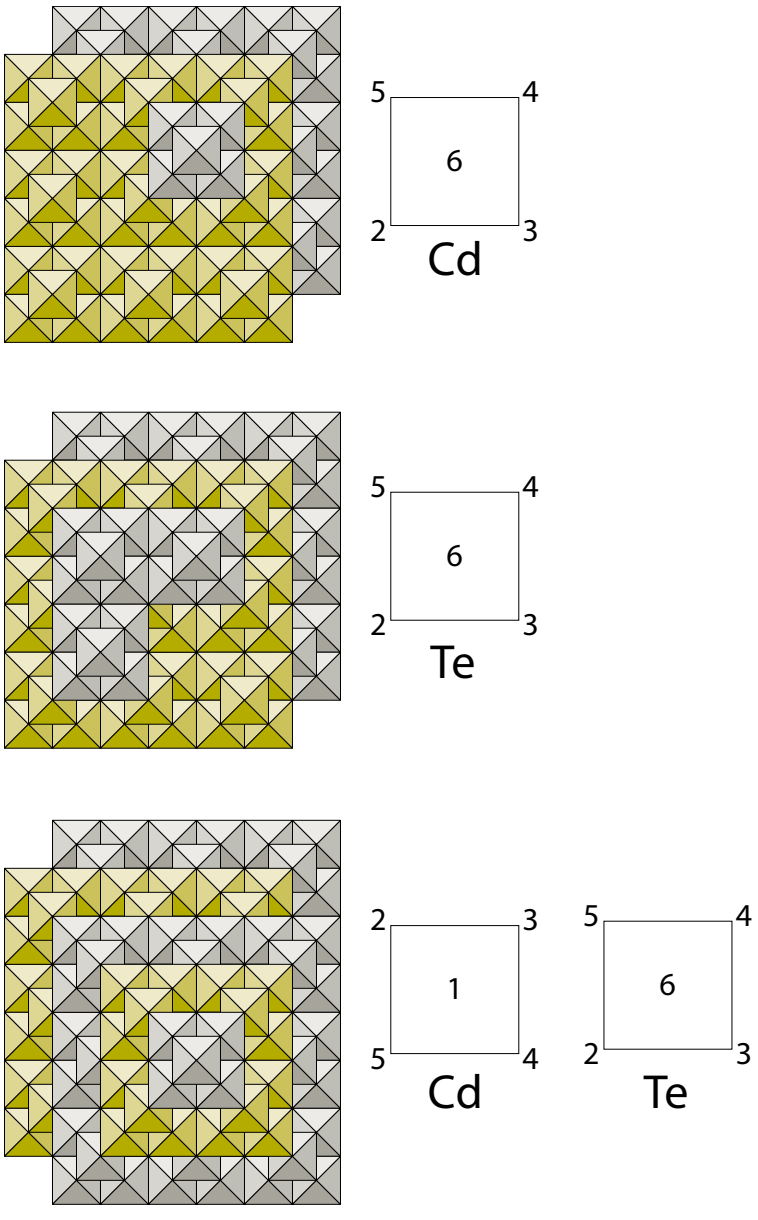

Fig. 29 CdTe-group

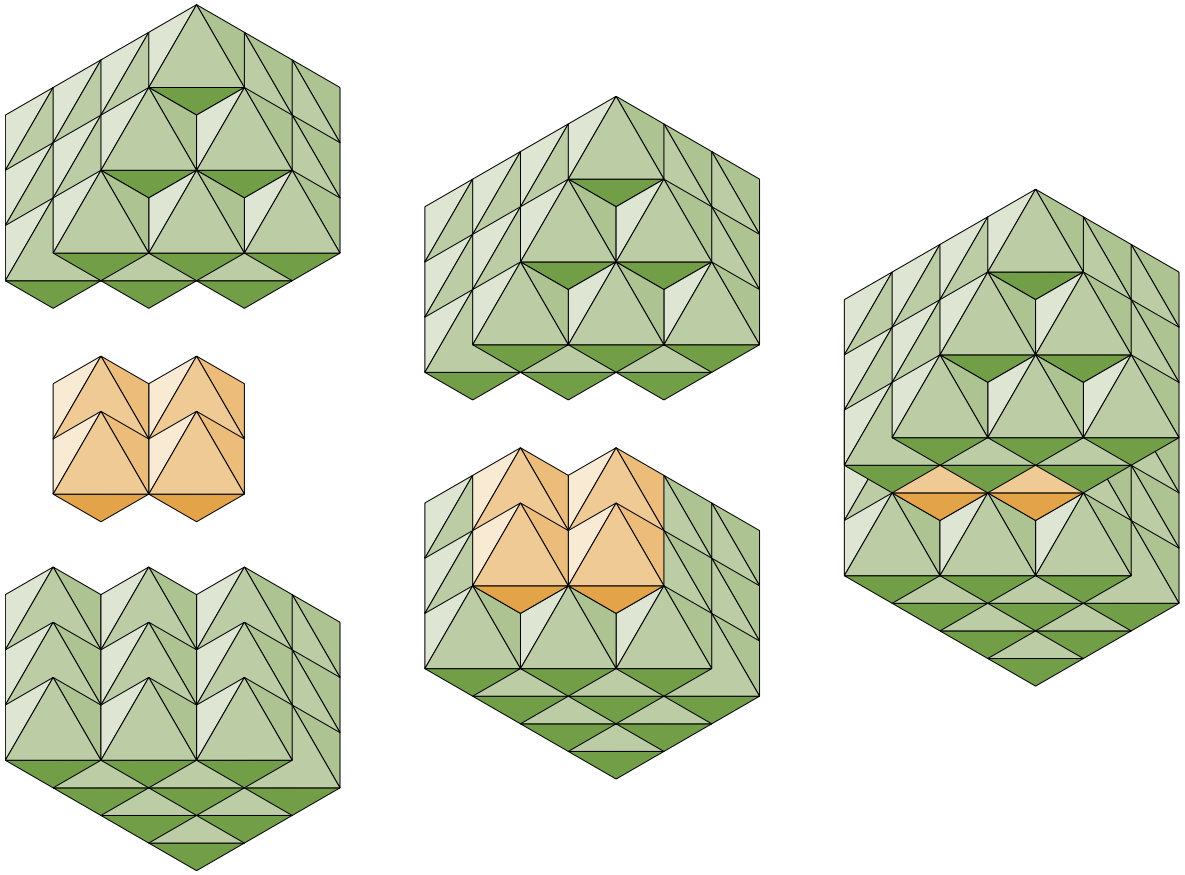

Fig. 30 CdTe-group facial

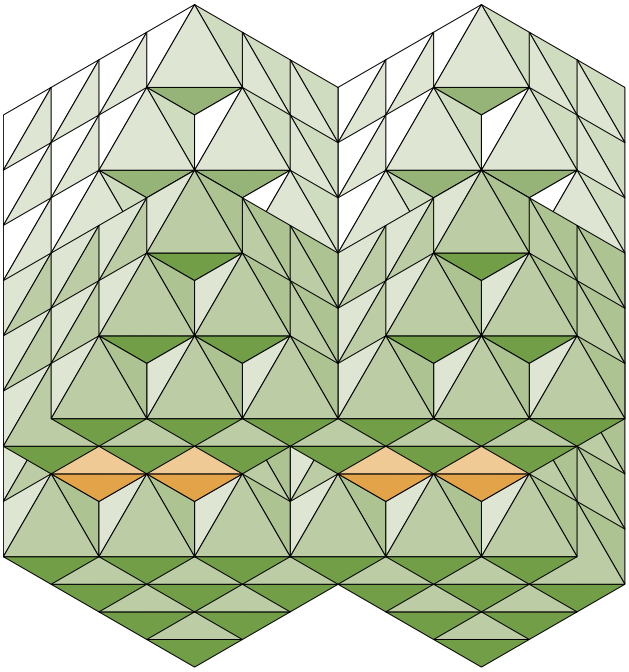

Fig. 31 CdTe-crystal plane

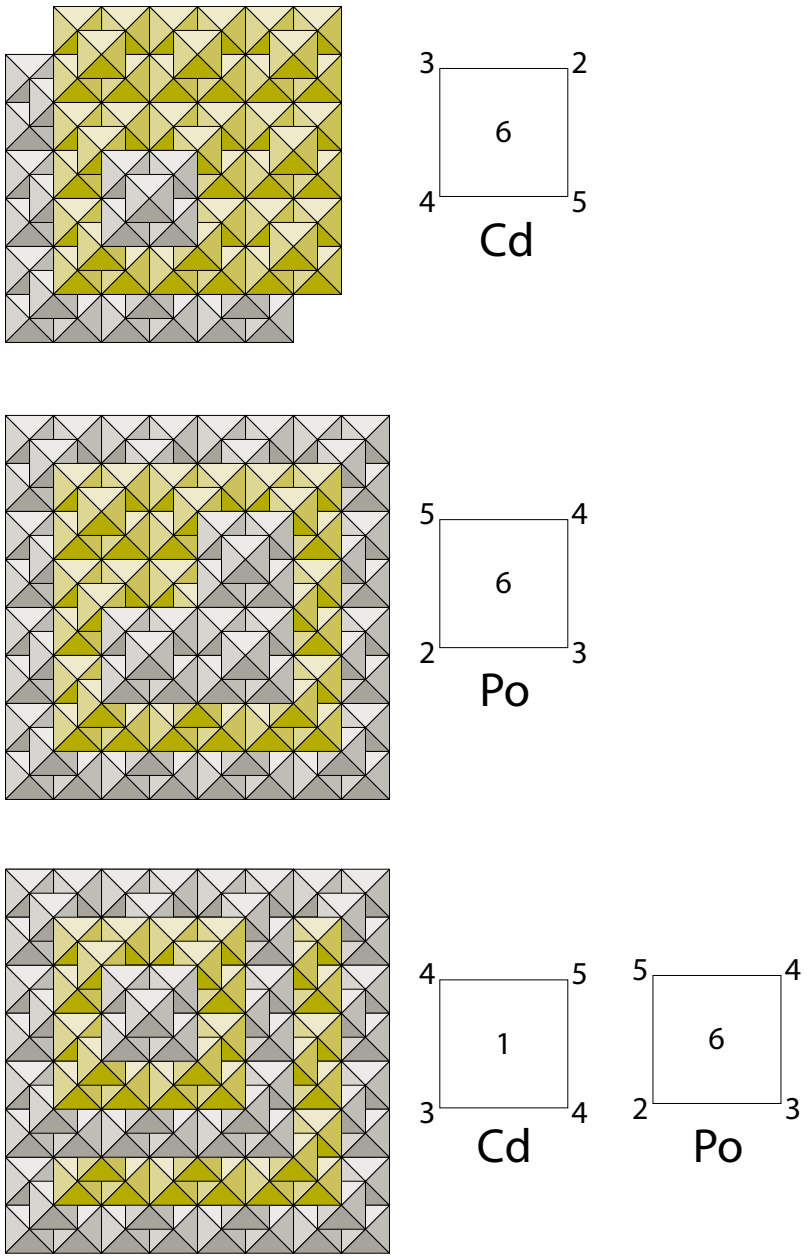

Fig. 32 CdPo-group

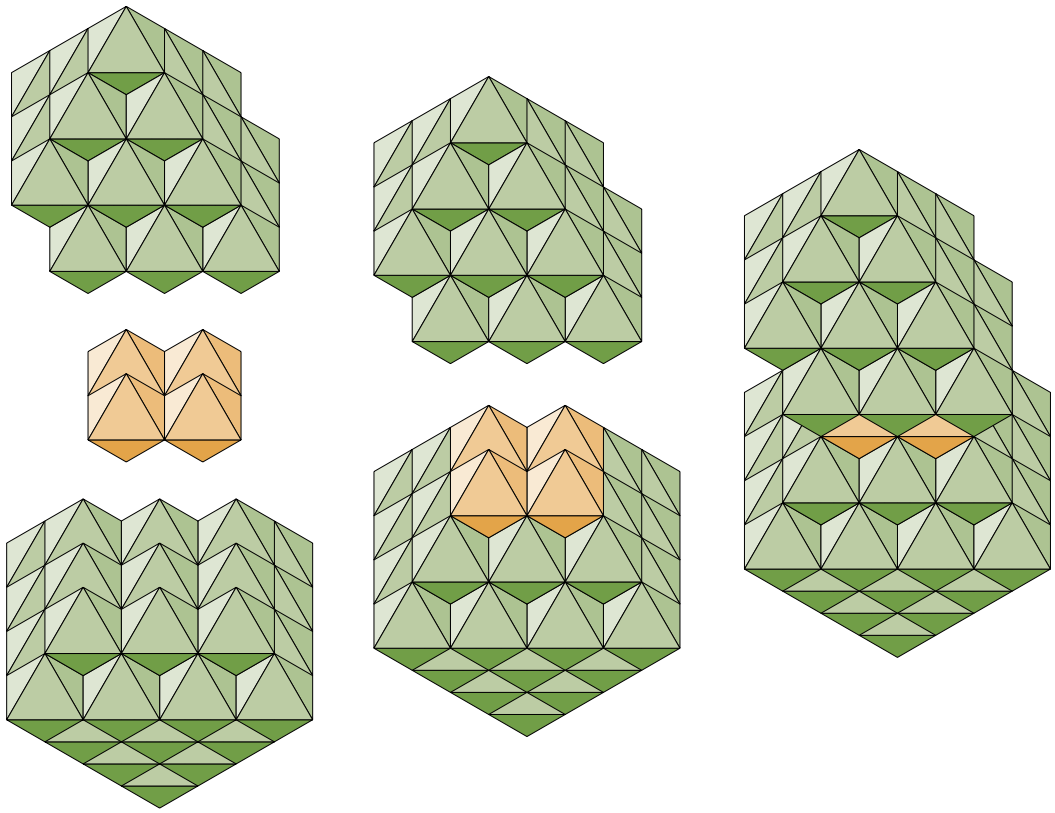

Fig. 33 CdPo-group facial

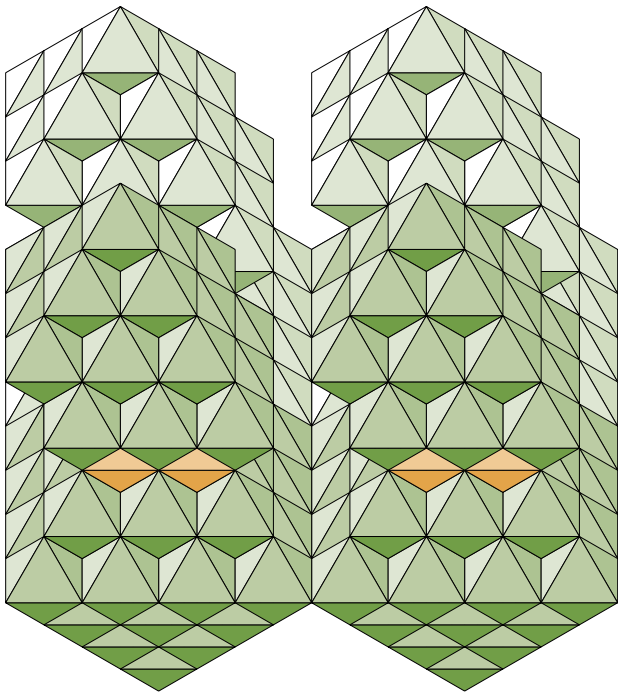

Fig. 34 CdPo-crystal layer

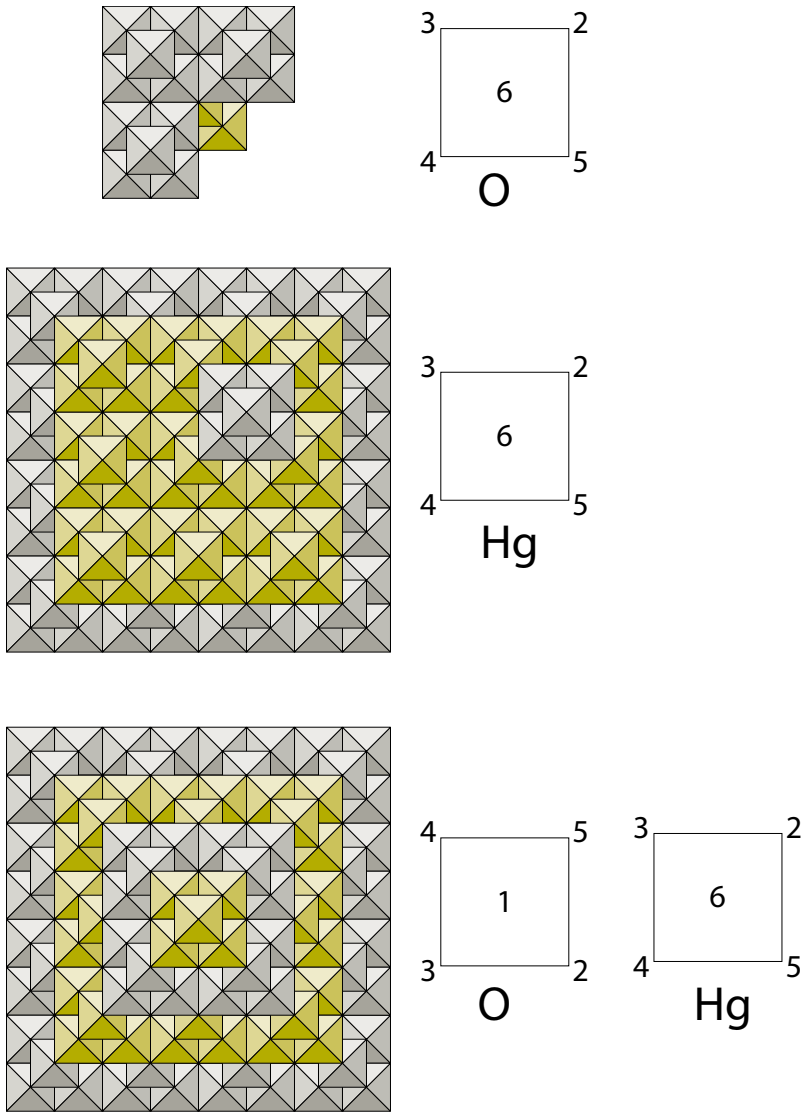

Fig. 35 HgO-group

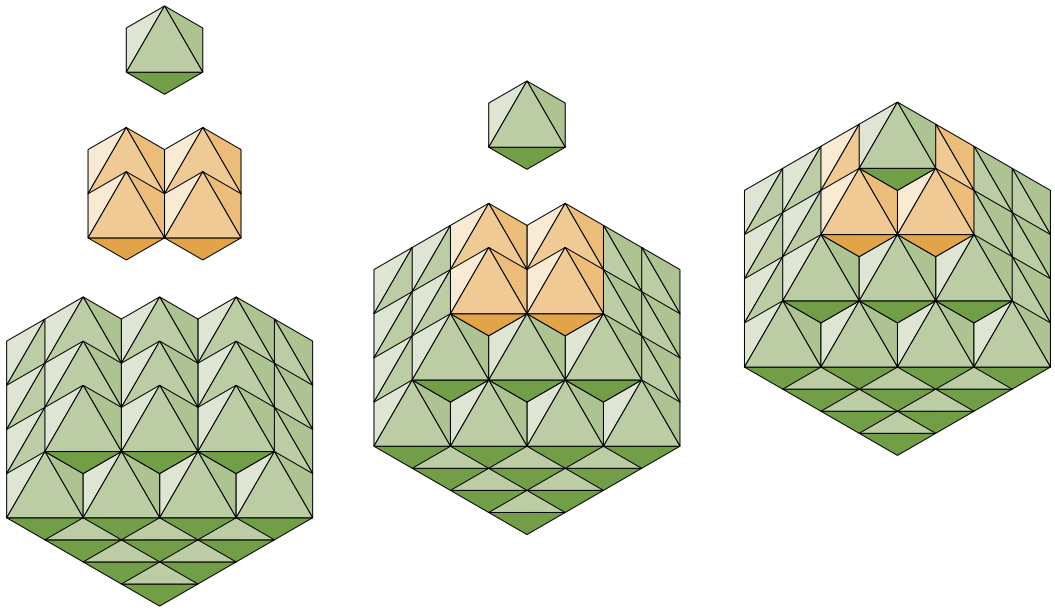

Fig. 36 HgO-group facial

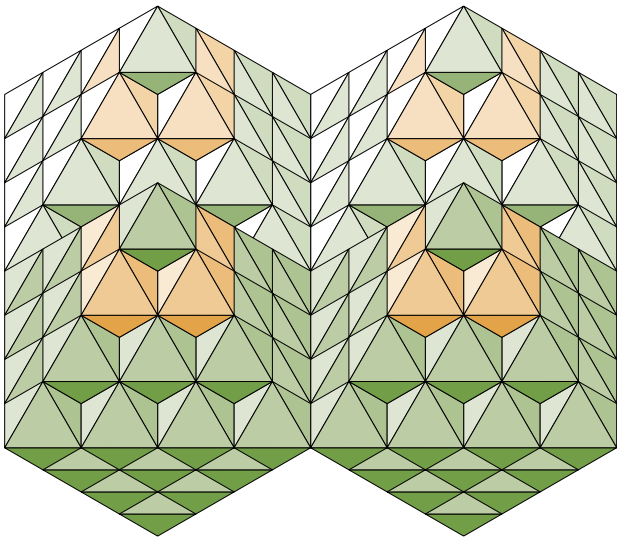

Fig. 37 HgO-crystal layer

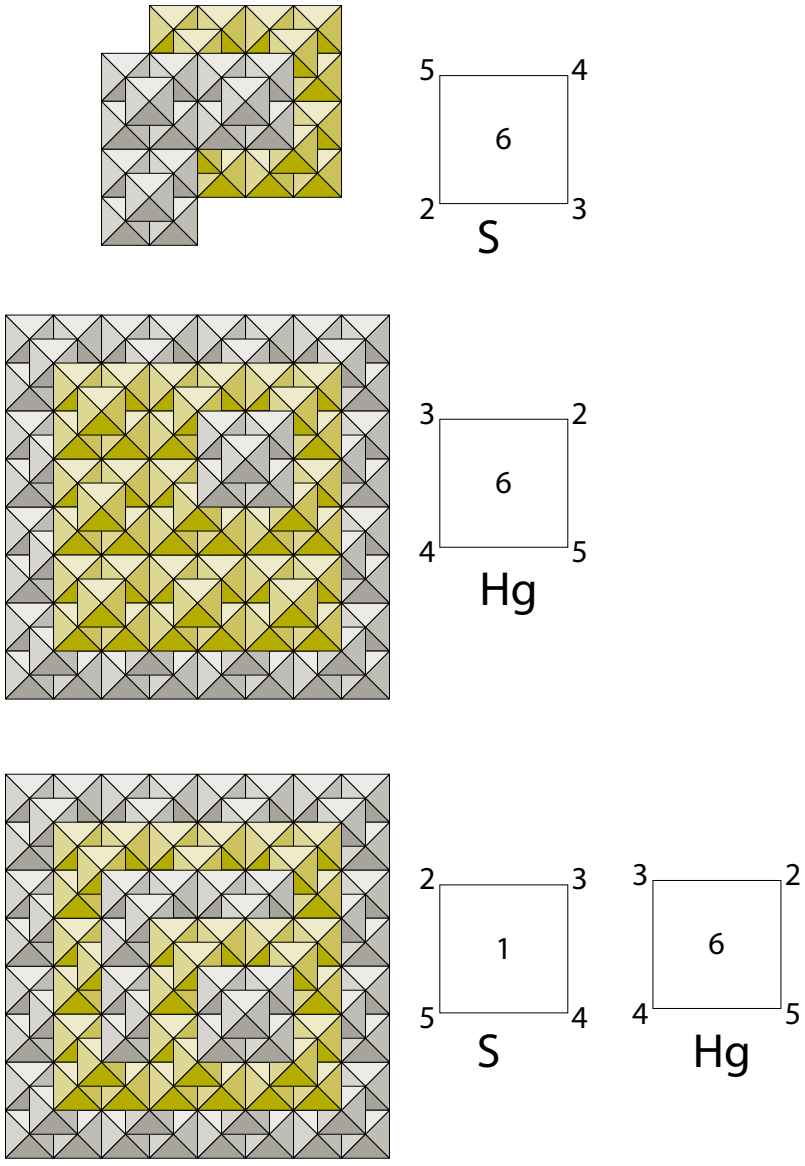

Fig. 38 HgS-group

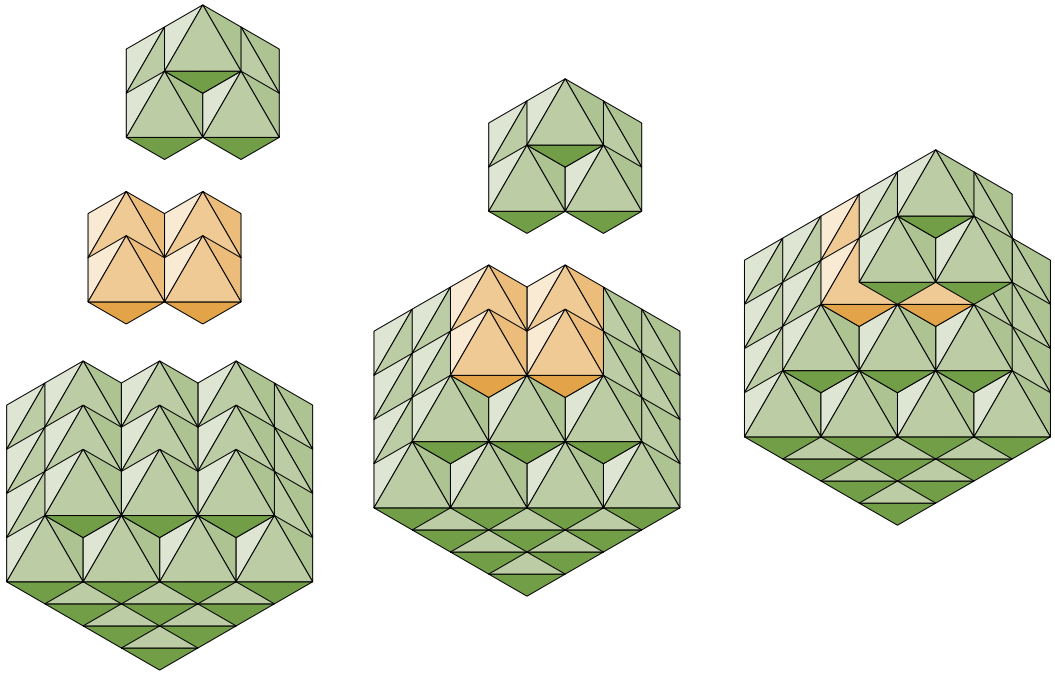

Fig. 39 HgS-group facial

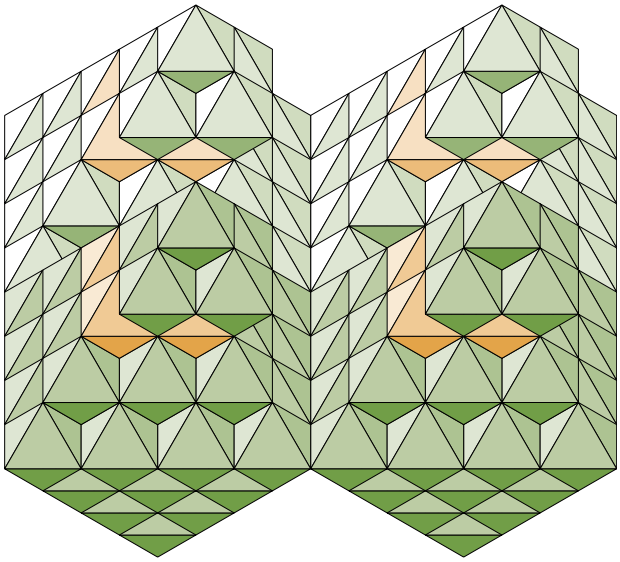

Fig. 40 HgS-crystal layer

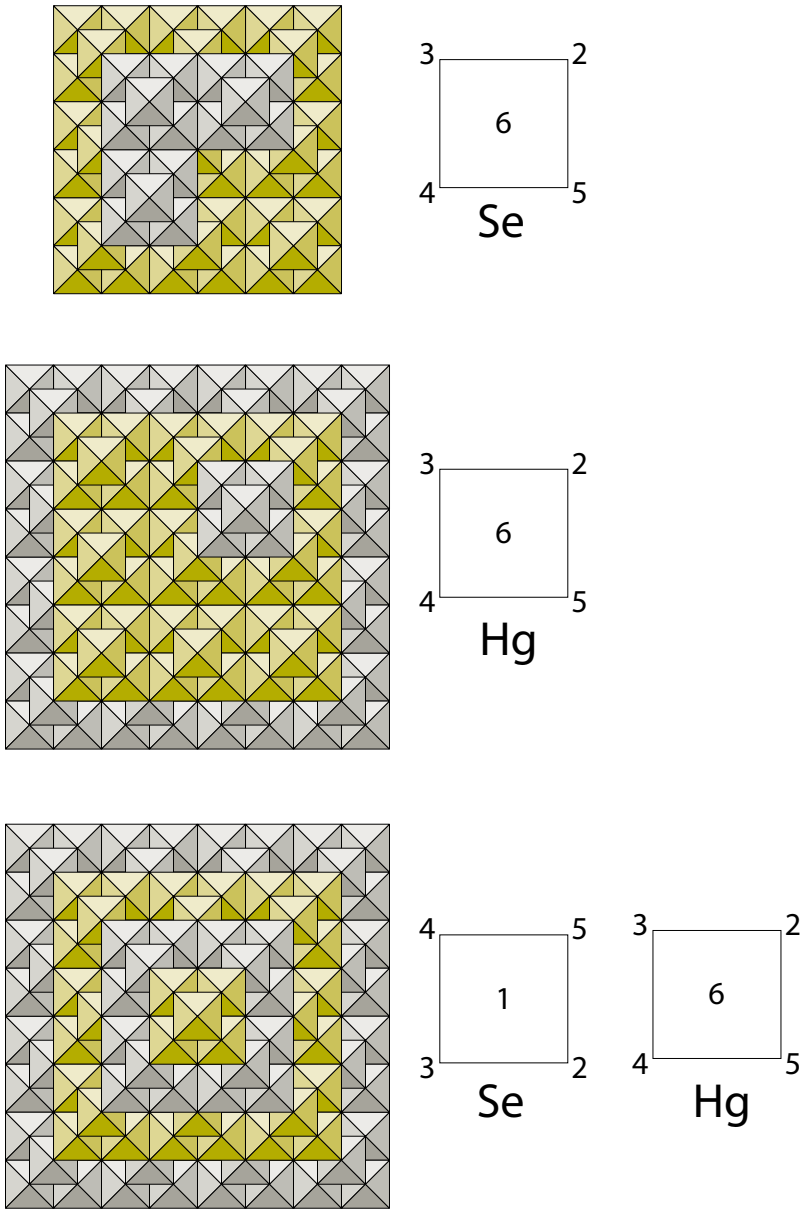

Fig. 41 HgSe-group

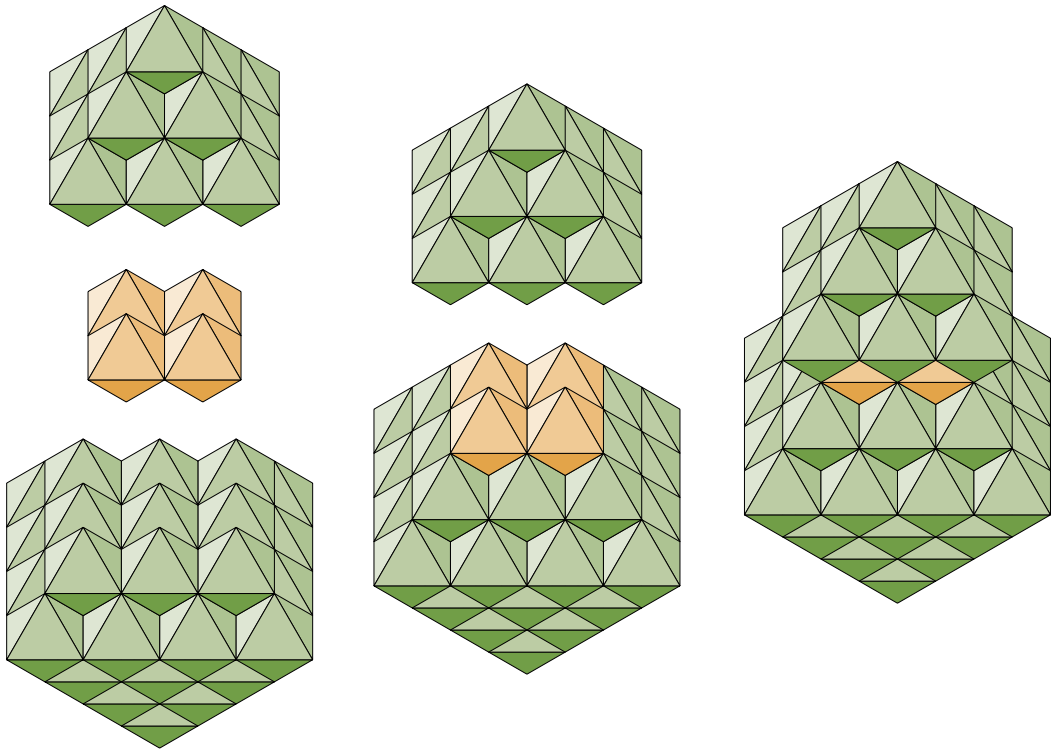

Fig. 42 HgSe-group facial

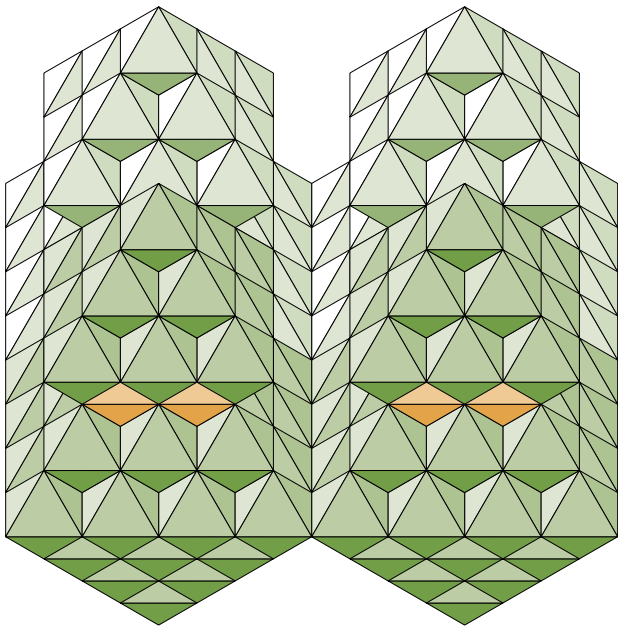

Fig. 43 HgSe-crystal layer

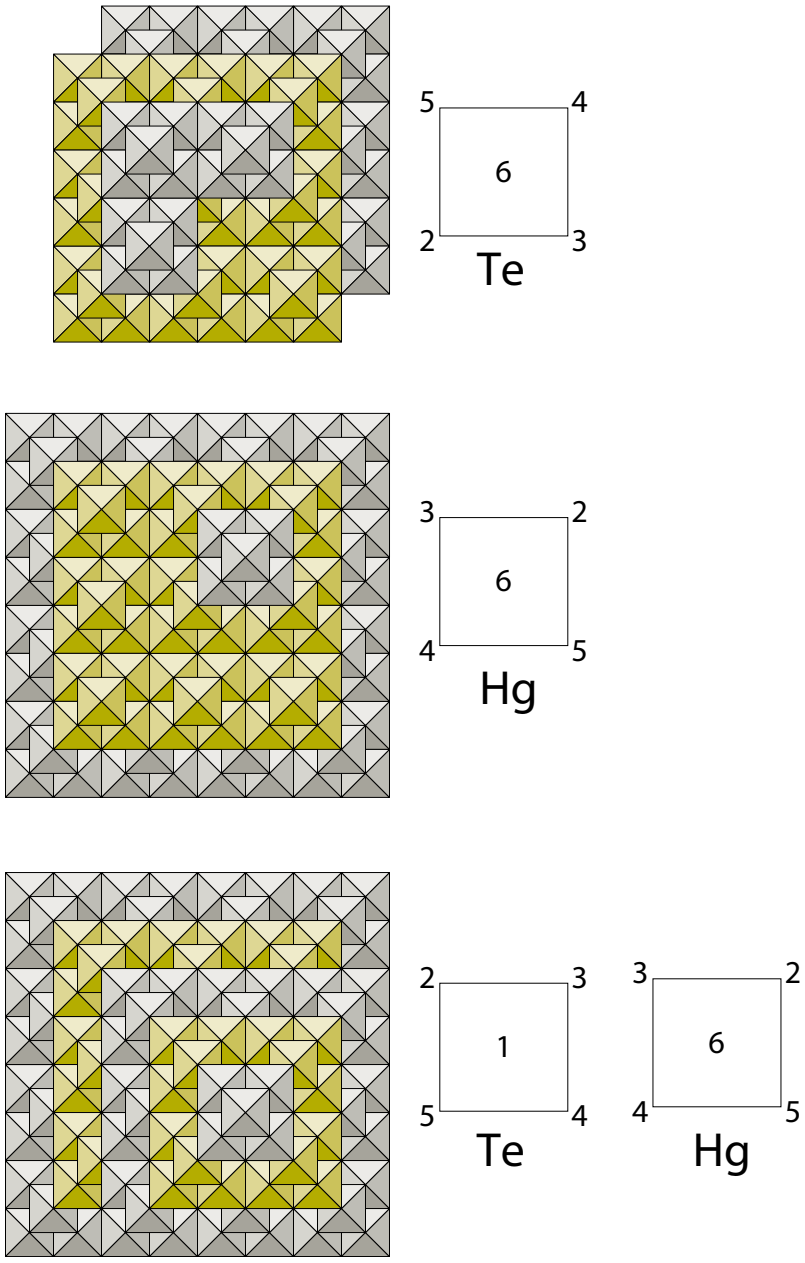

Fig. 44 HgTe-group

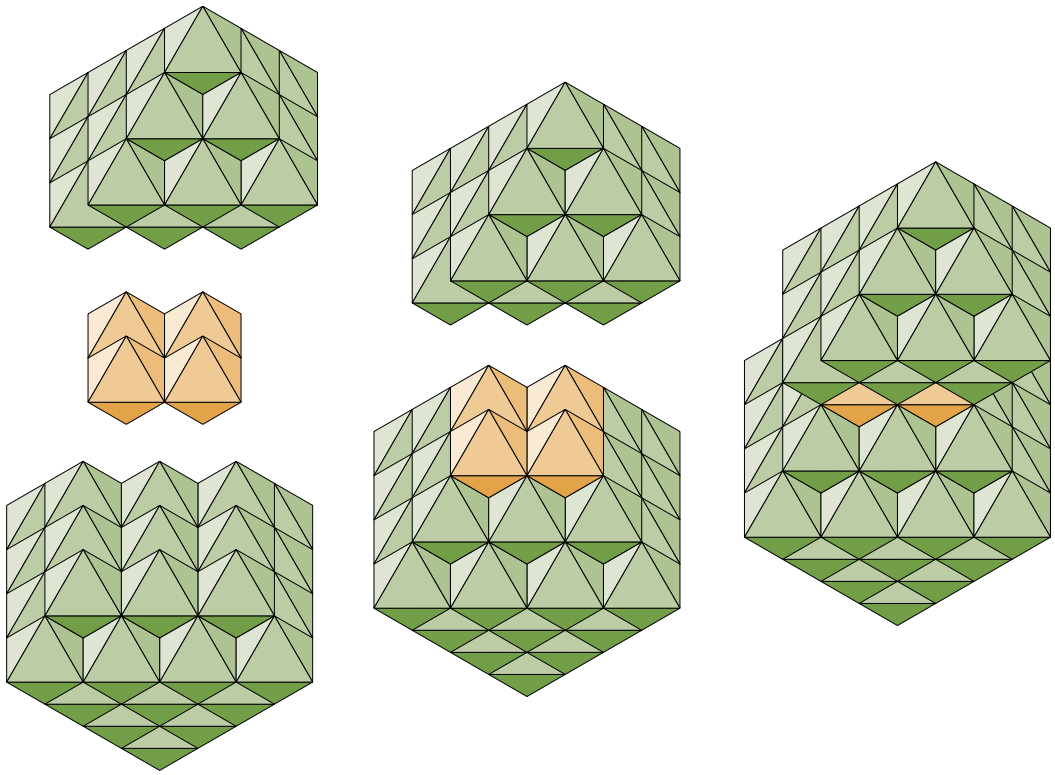

Fig. 45 HgTe-group facial

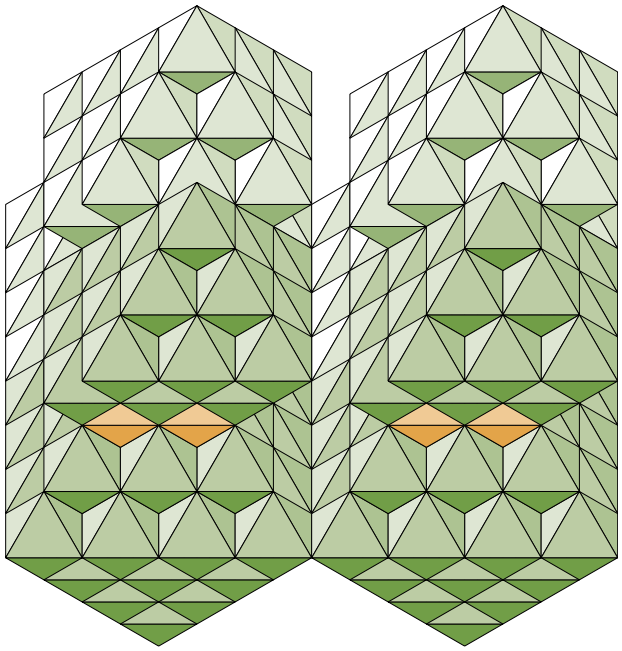

Fig. 46 HgTe-crystal layer

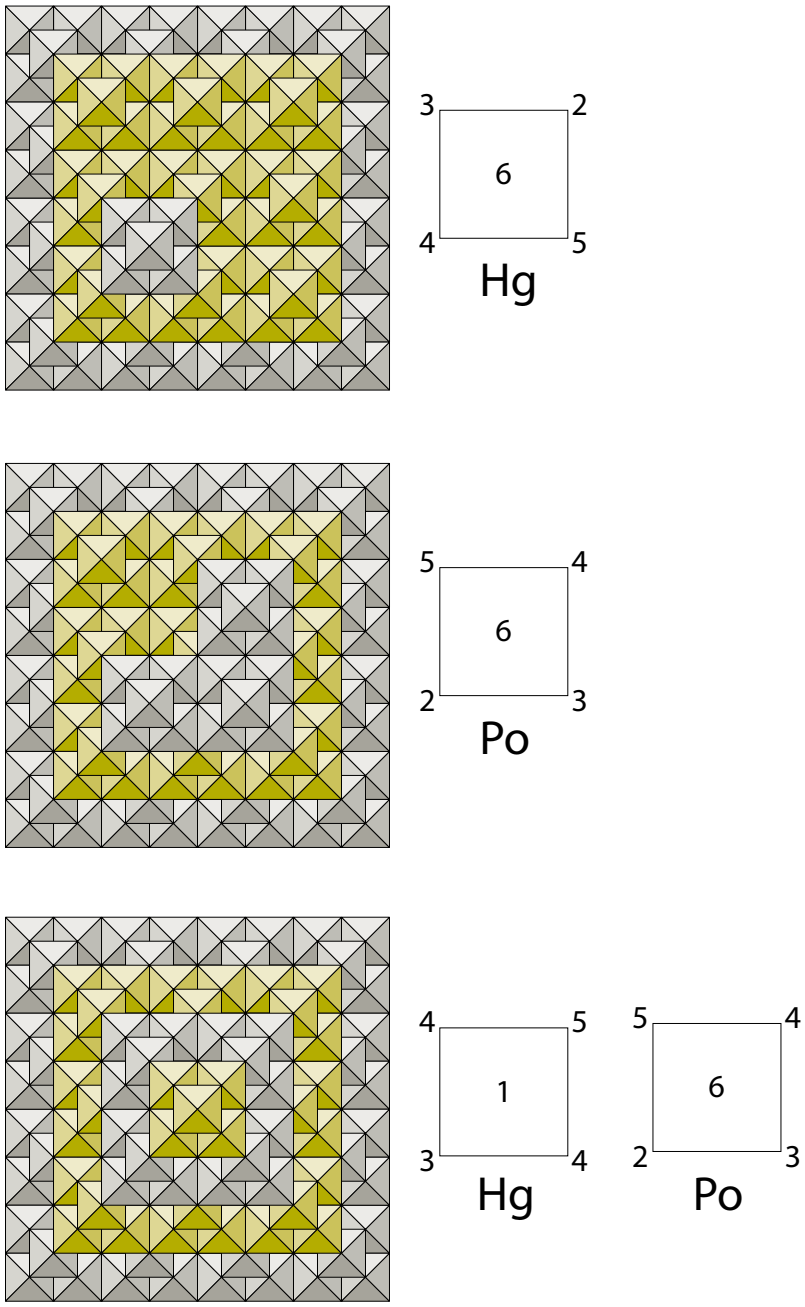

Fig. 47 HgPo-group

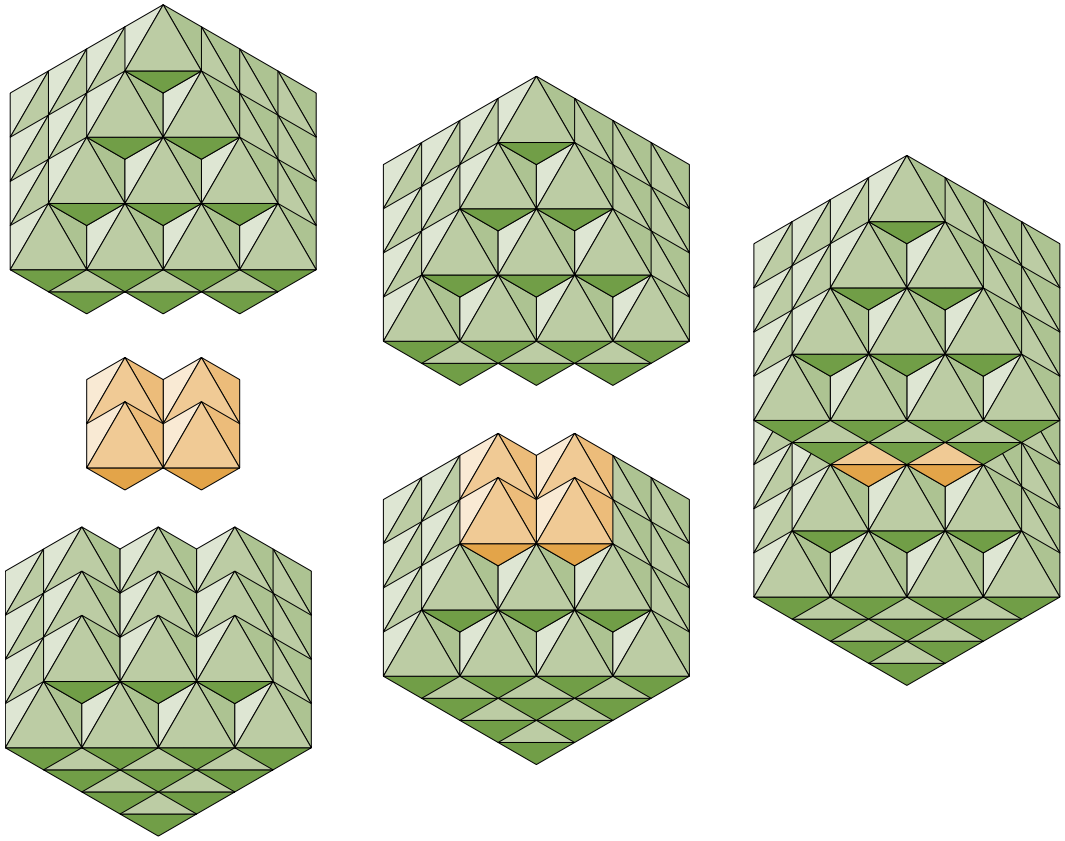

Fig. 48 HgPo-group facial

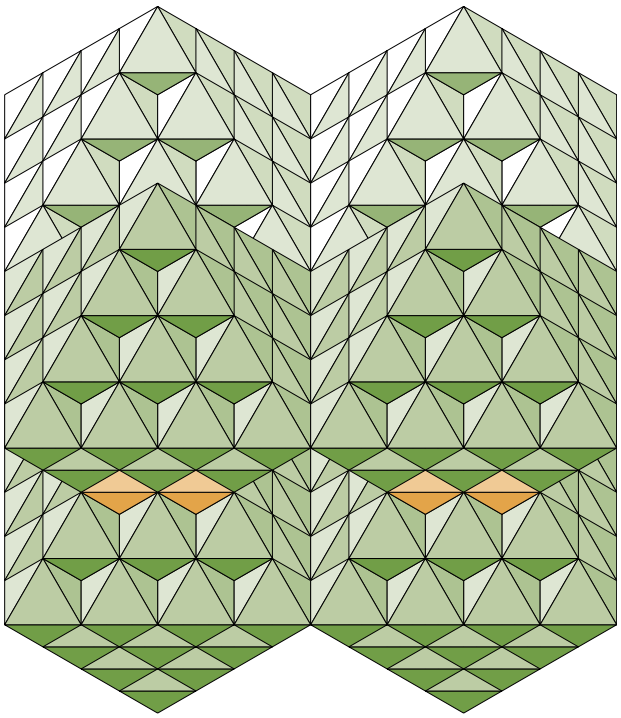

Fig. 49 HgPo-crystal layer

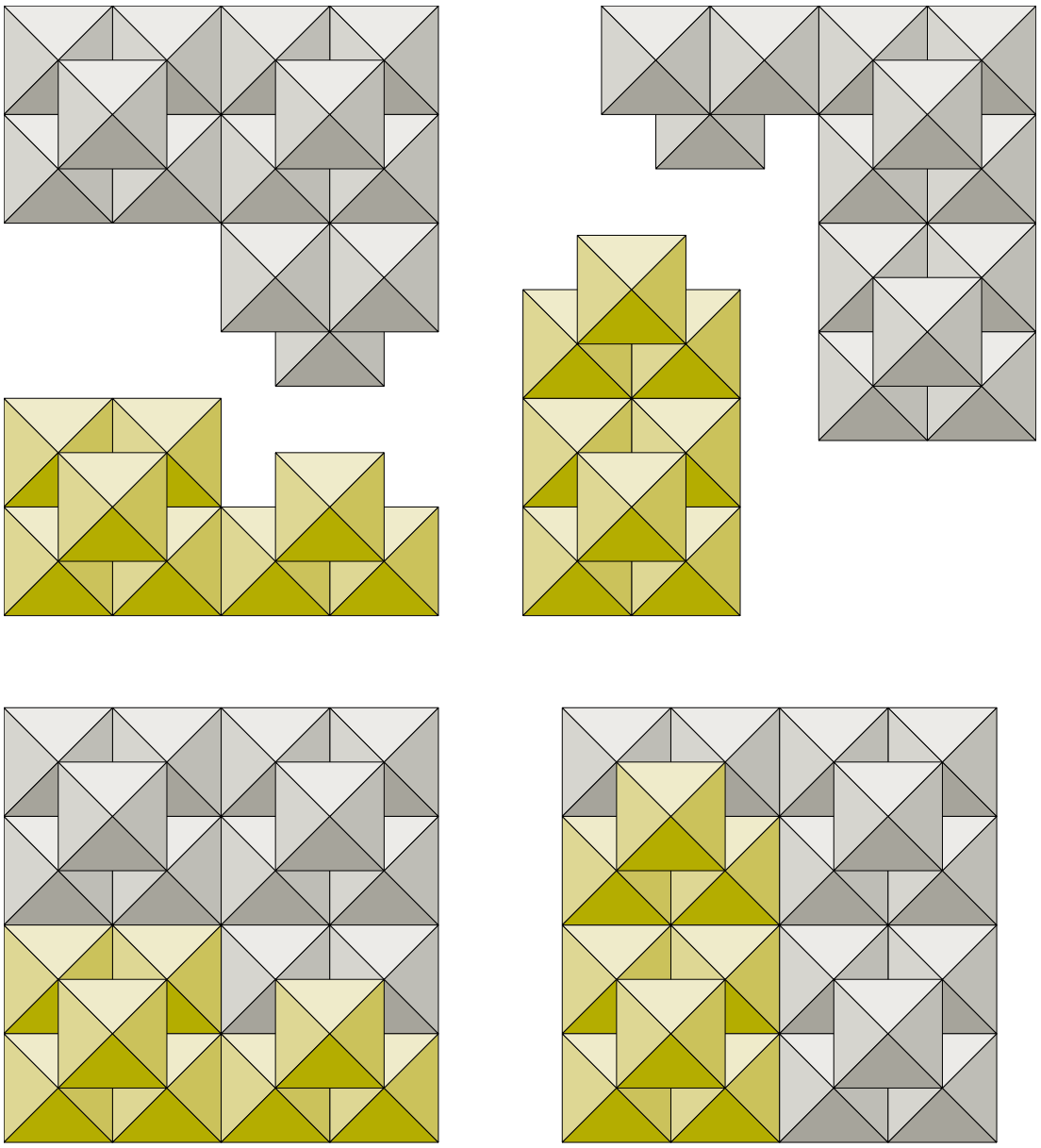

Fig. 50 One-and-a-half plus two-and-a-half–layer

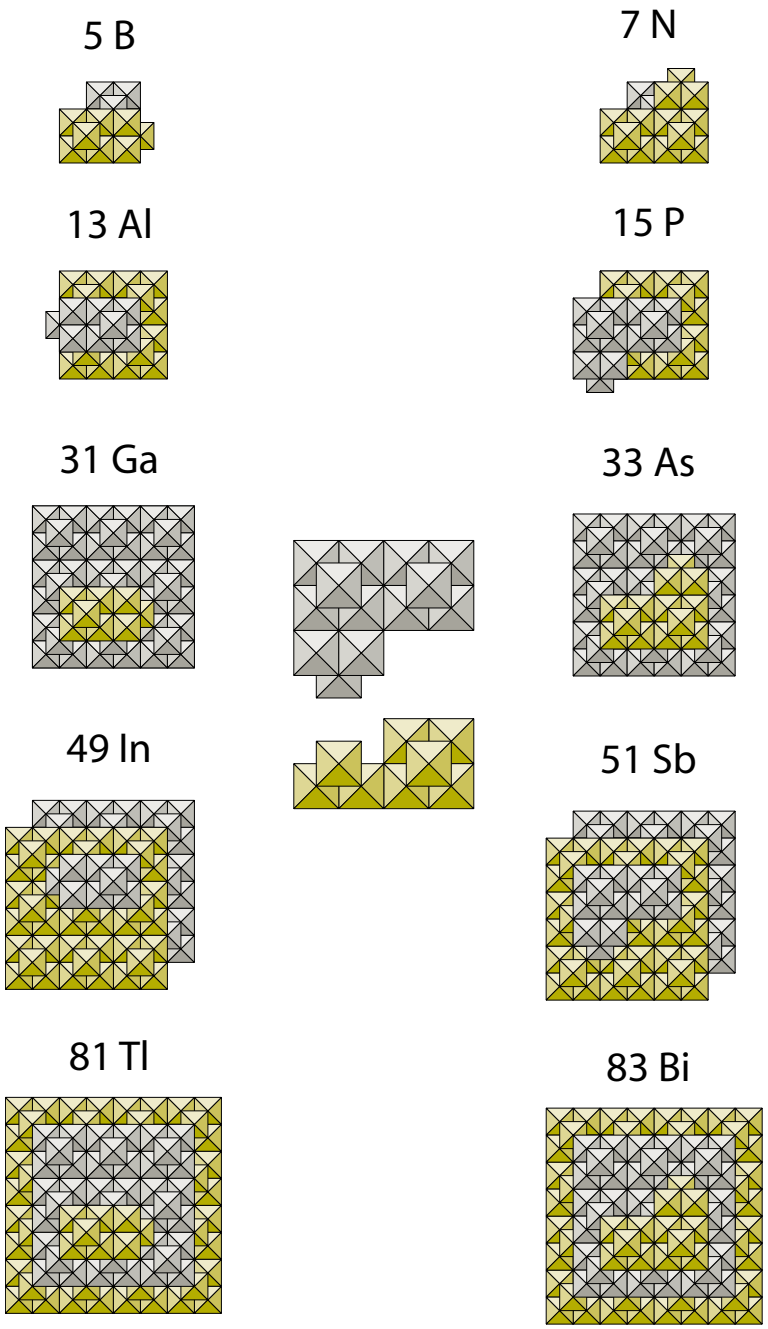

Fig. 51 One-and-a-half plus two-and-a-half–elements

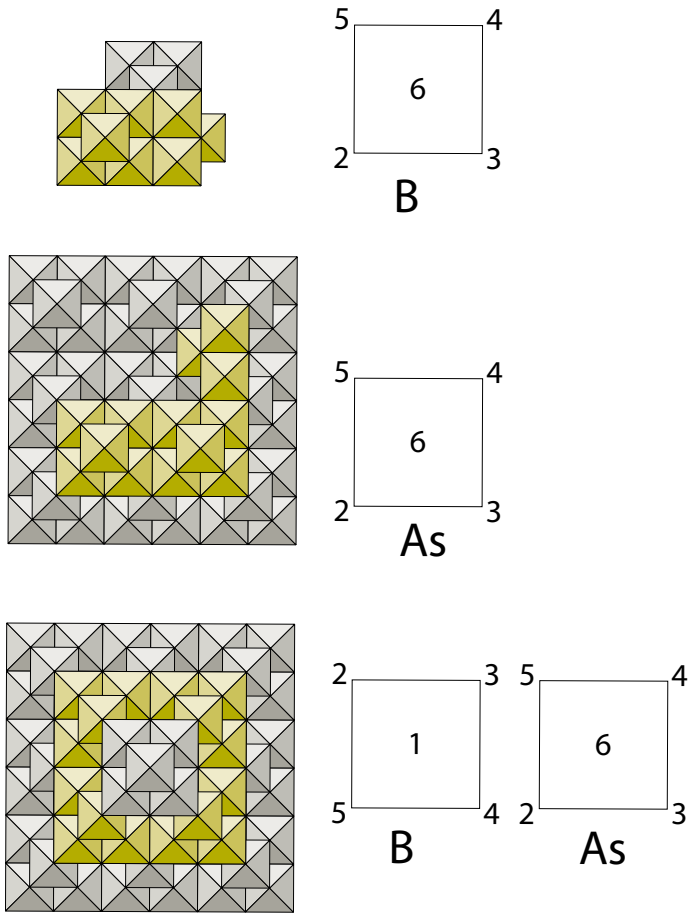

Fig. 52 BAs-group
The BAs-group is a Sr-atom homomorph.

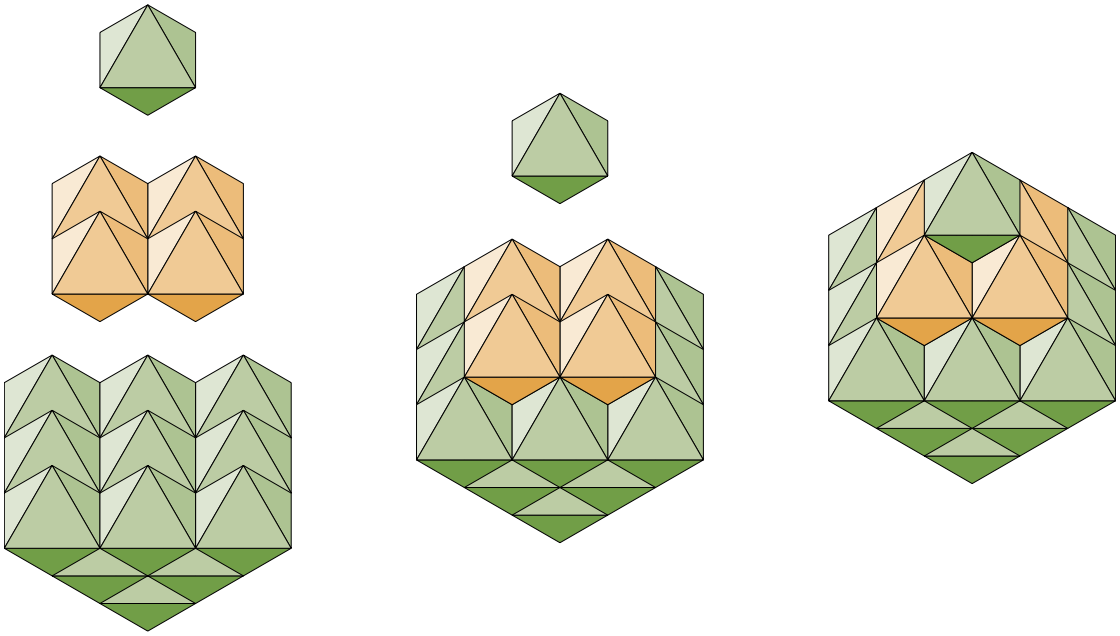

Fig. 53 BAs-group facial

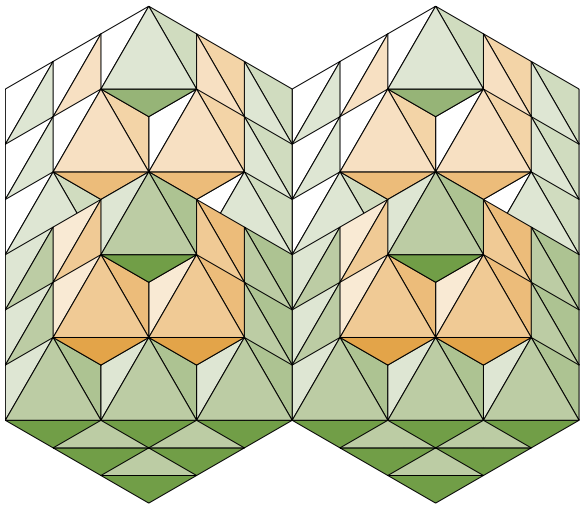

Fig. 54 BAs-crystal layer

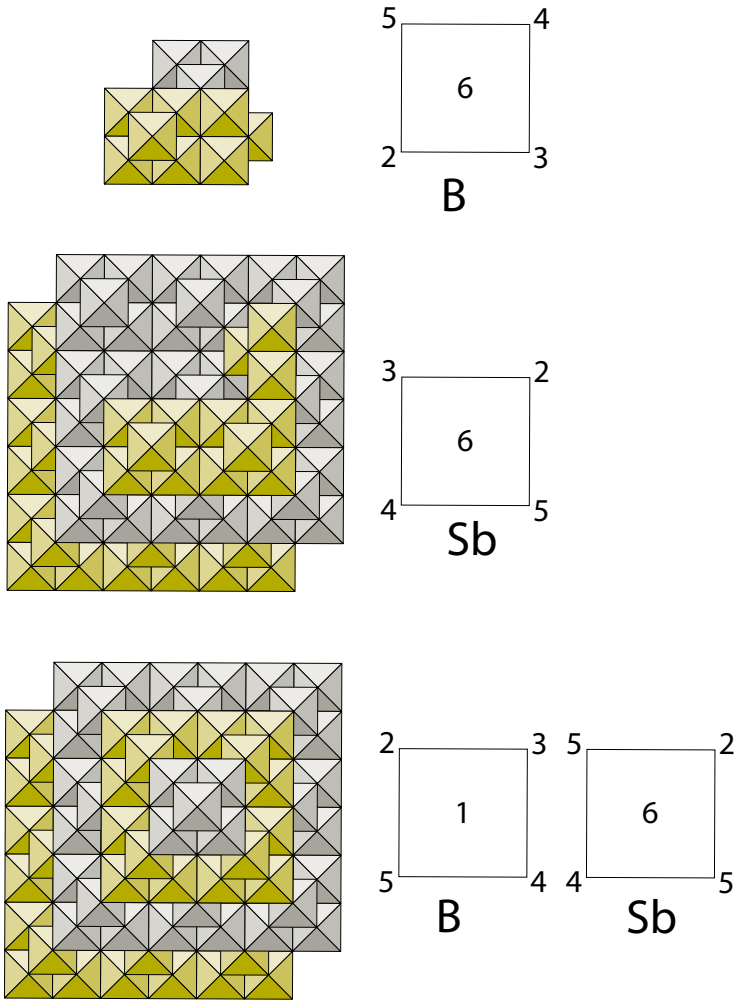

Fig. 55 BSb-group
The BSb-group is a Ba-atom homomorph.

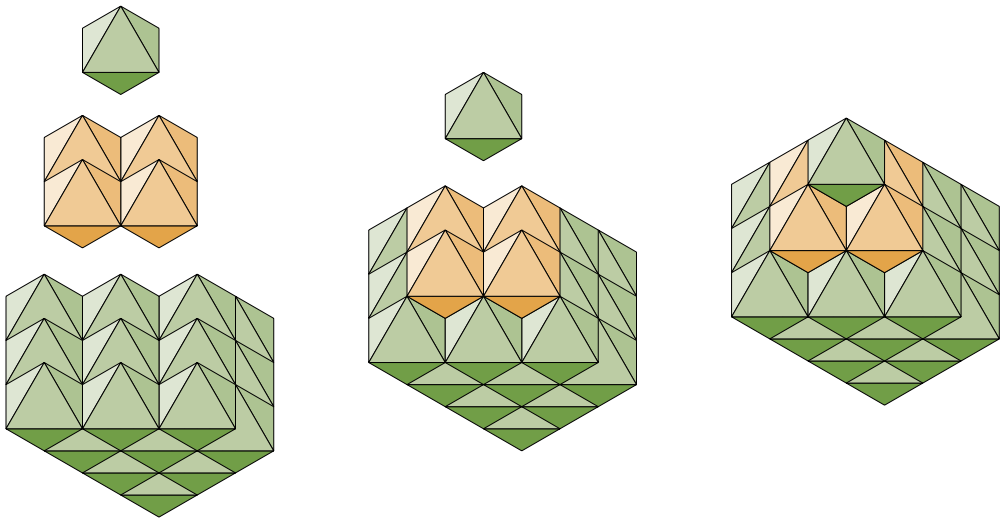

Fig. 56 BSb-group facial

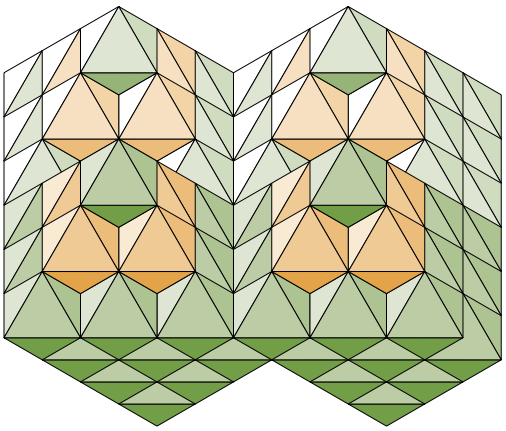

Fig. 57 BSb-crystal layer

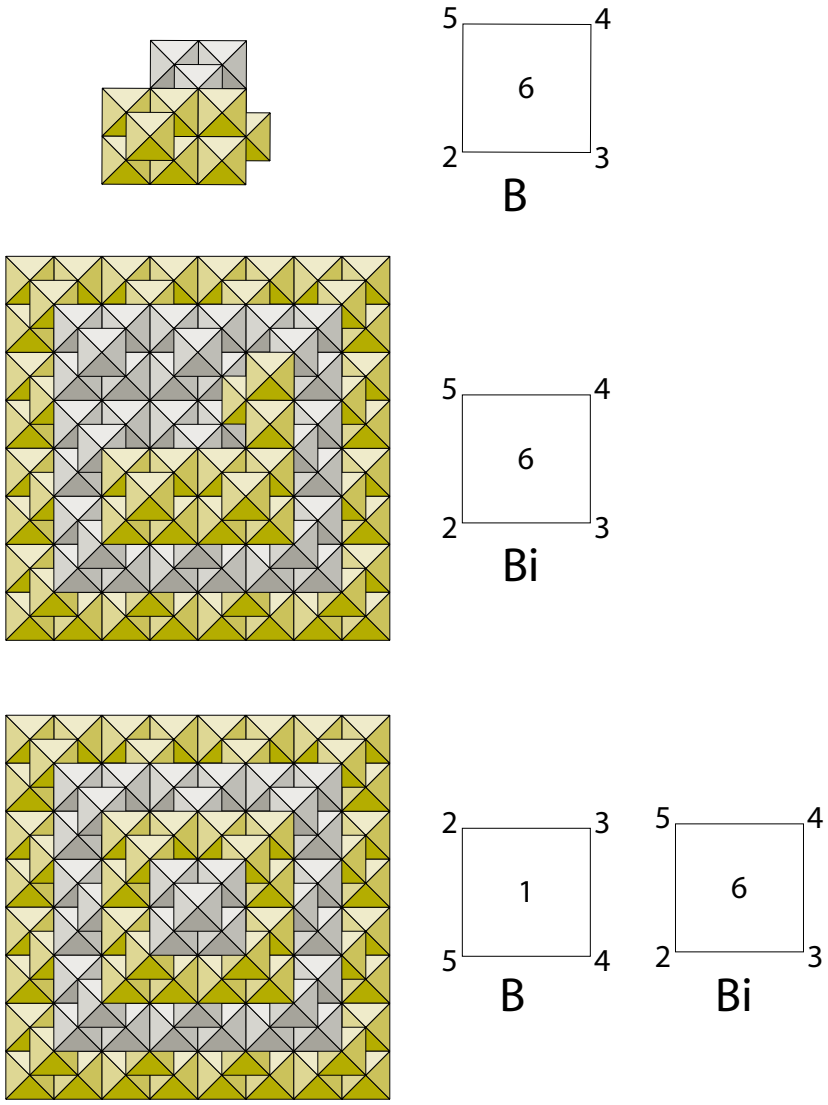

Fig. 58 BBi-group
The BBi-group is a Ra-atom homomorph.

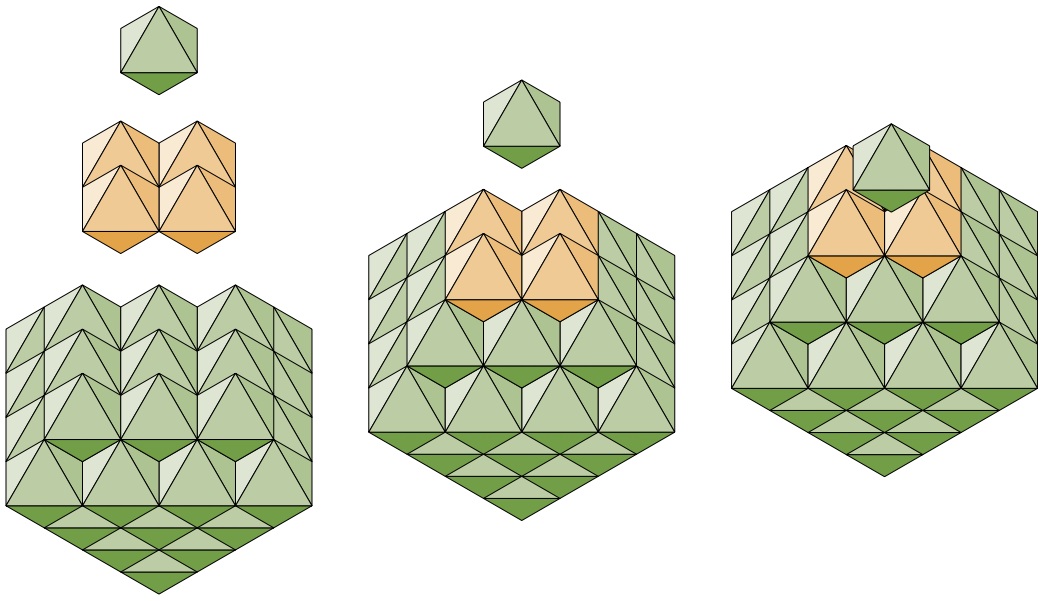

Fig. 59 BBi-group facial

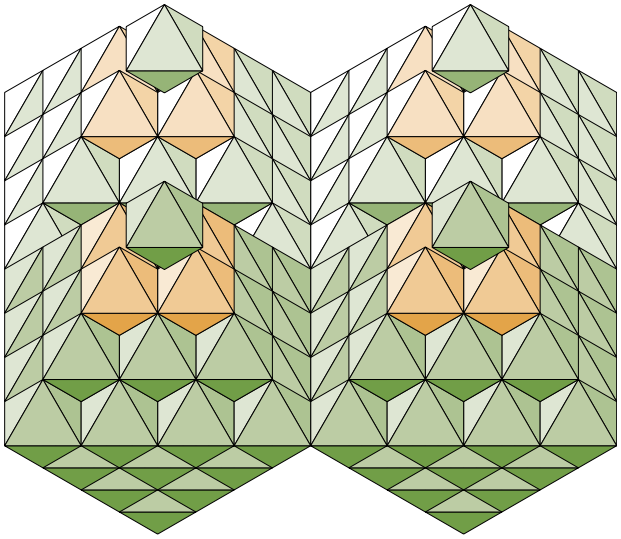

Fig. 60 BBi-crystal layer

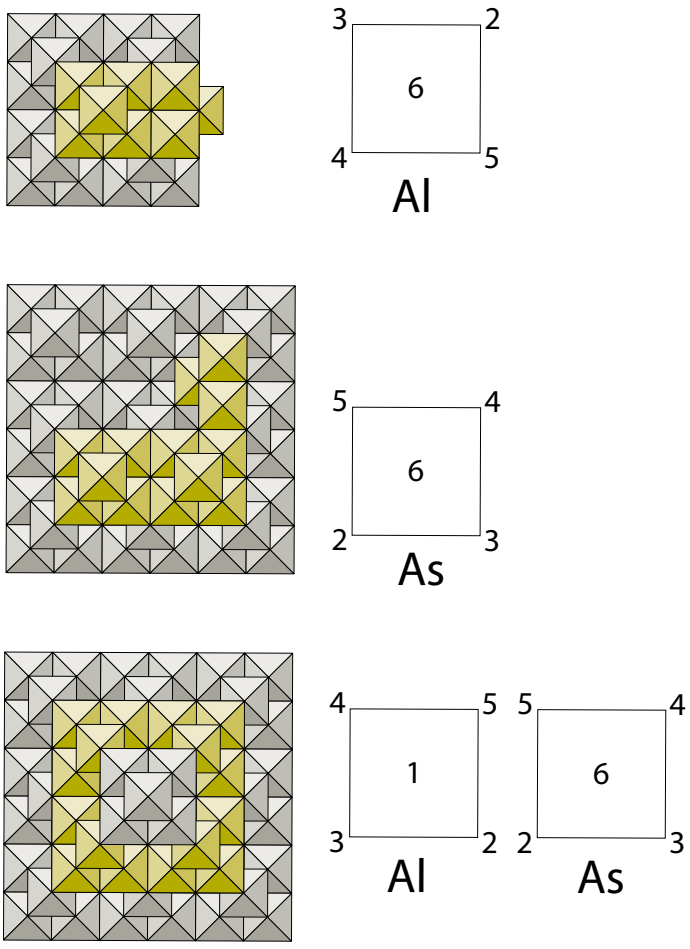

Fig. 61 AlAs-group

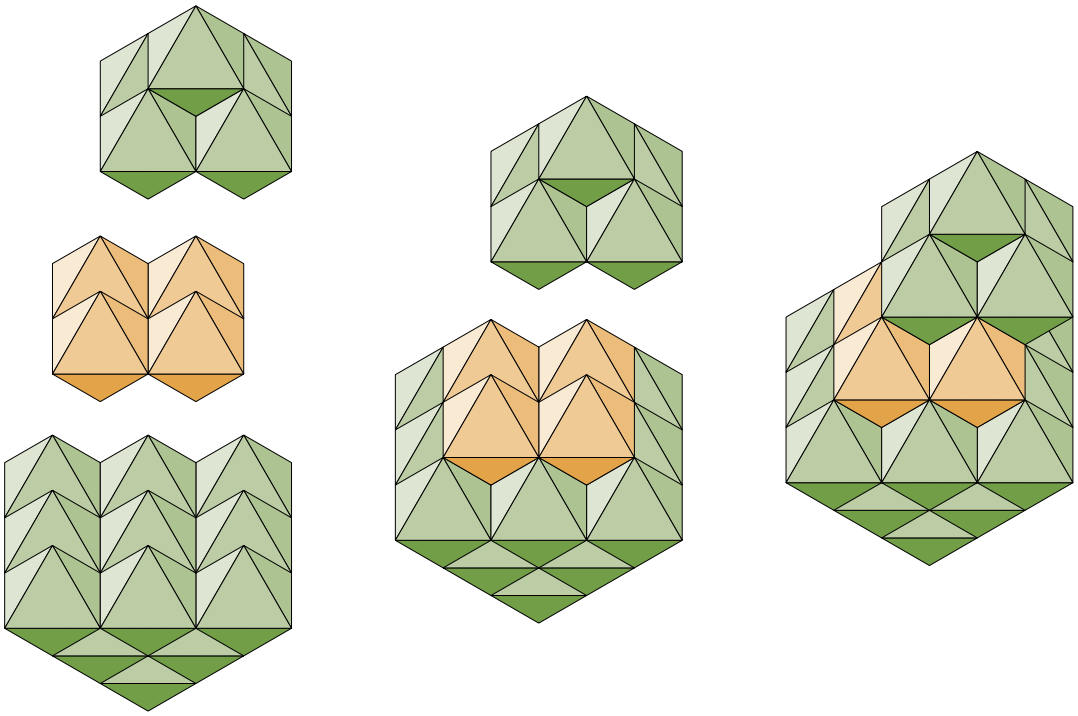

Fig. 62 AlAs-group facial

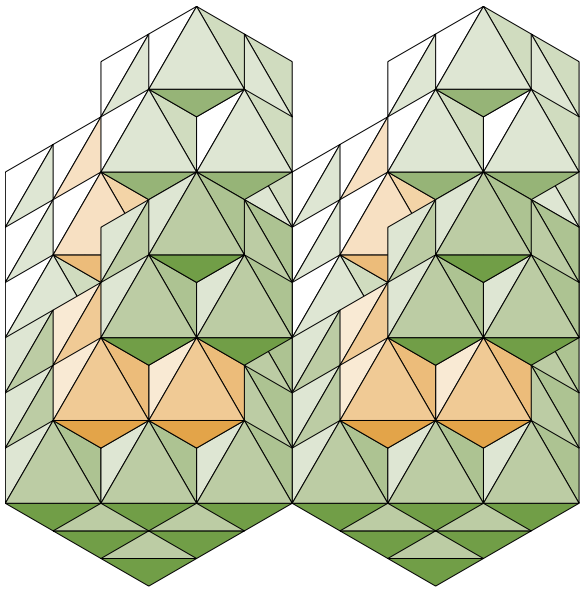

Fig. 63 AlAs-crystal layer

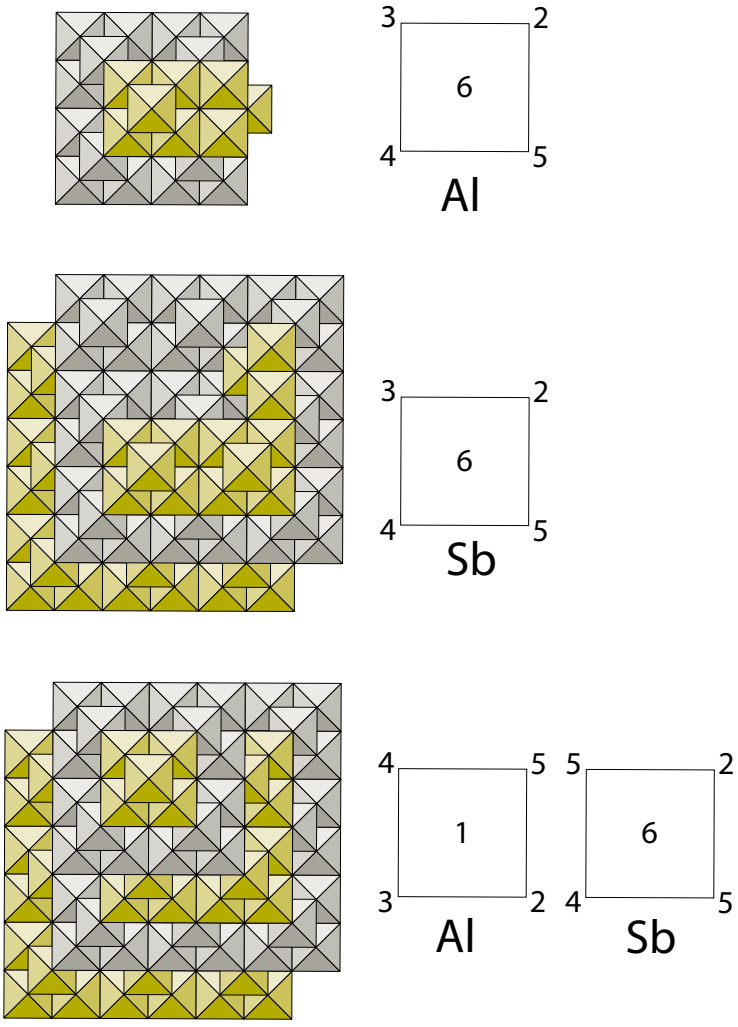

Fig. 64 AlSb-group

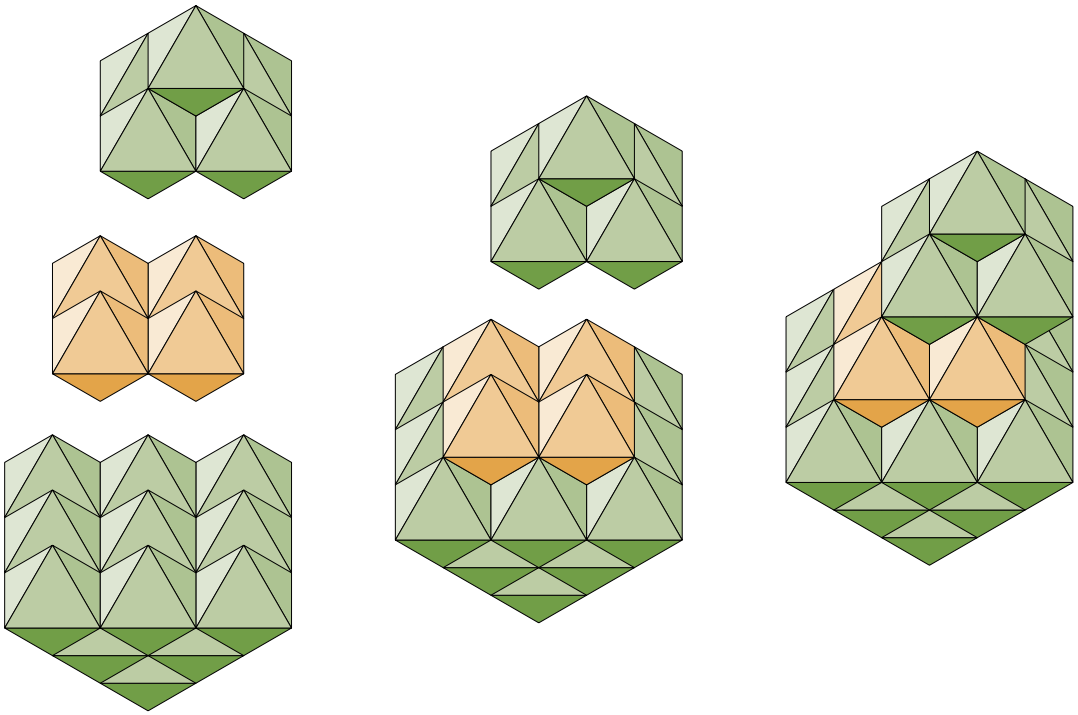

Fig. 65 AlSb-group

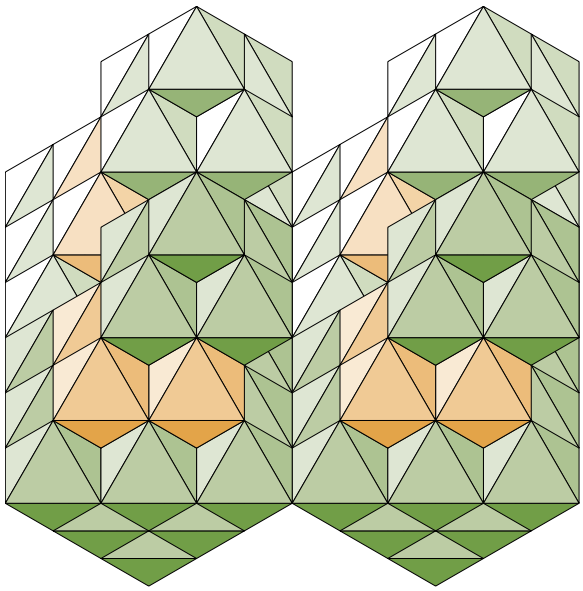

Fig. 66 AlSb-crystal layer

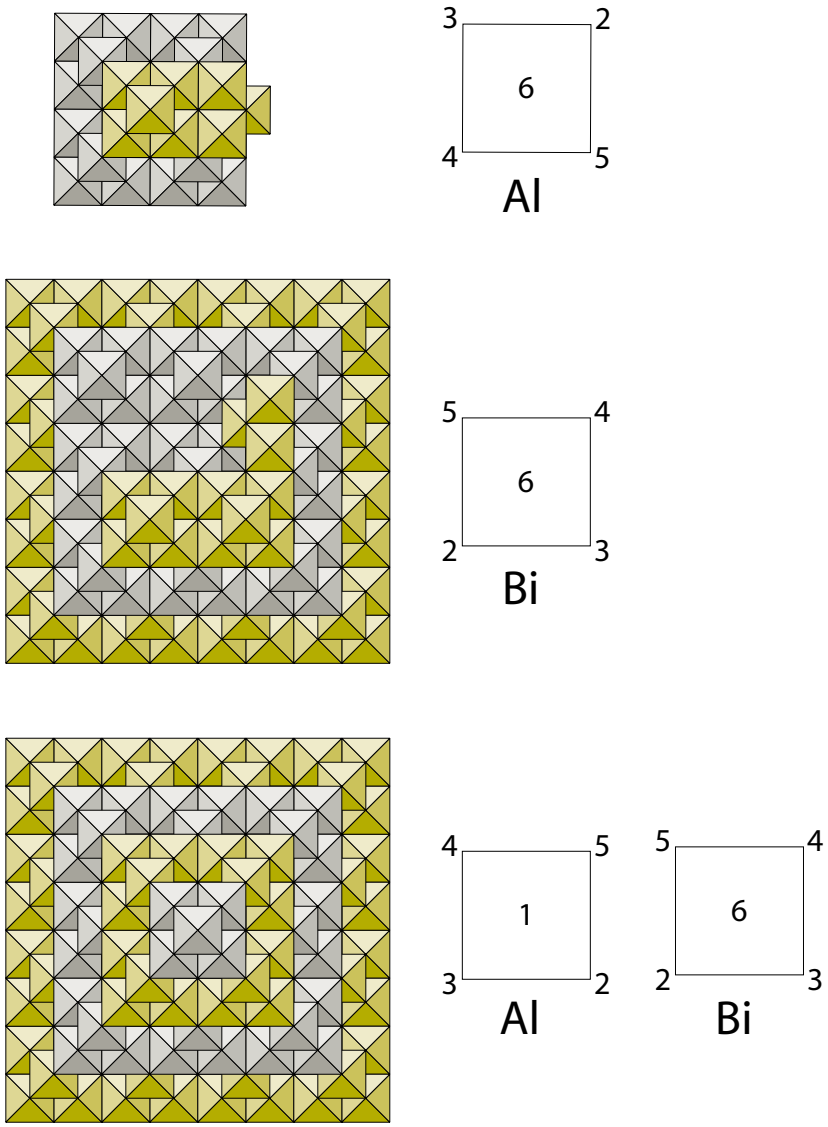

Fig. 67 AlBi-group

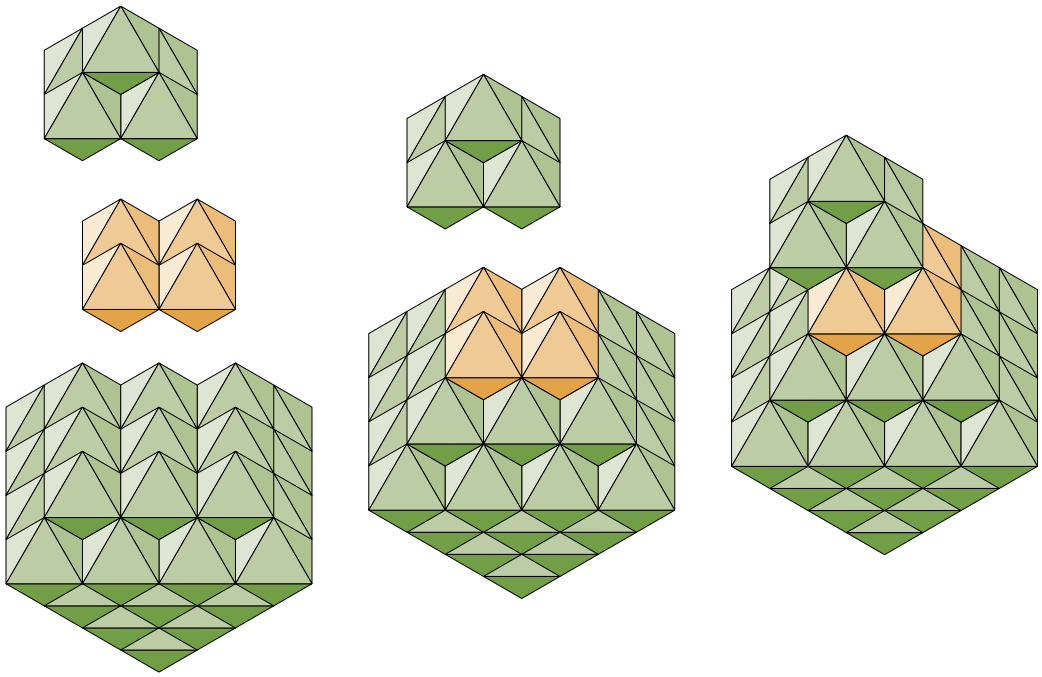

Fig. 68 AlBi-group facial

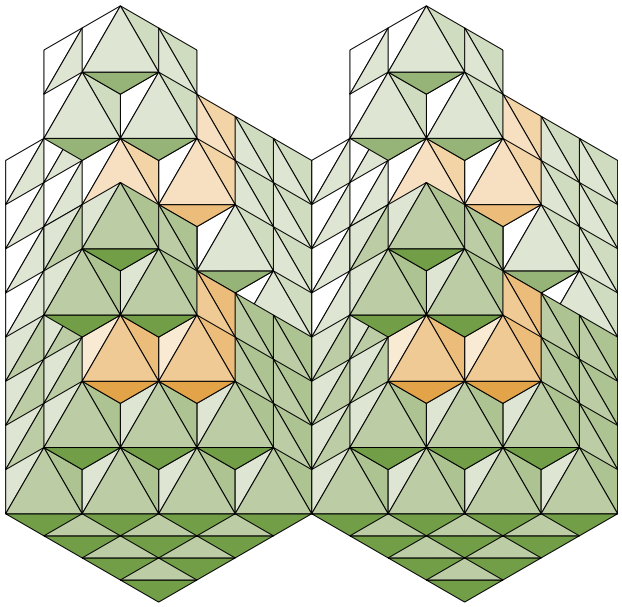

Fig. 69 AlBi-crystal layer

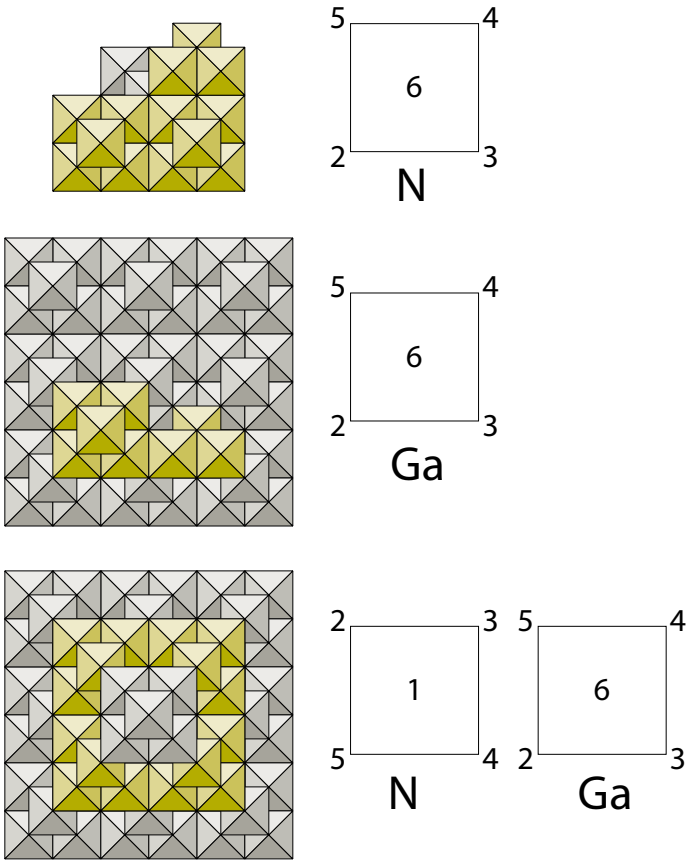

Fig. 70 GaN-group

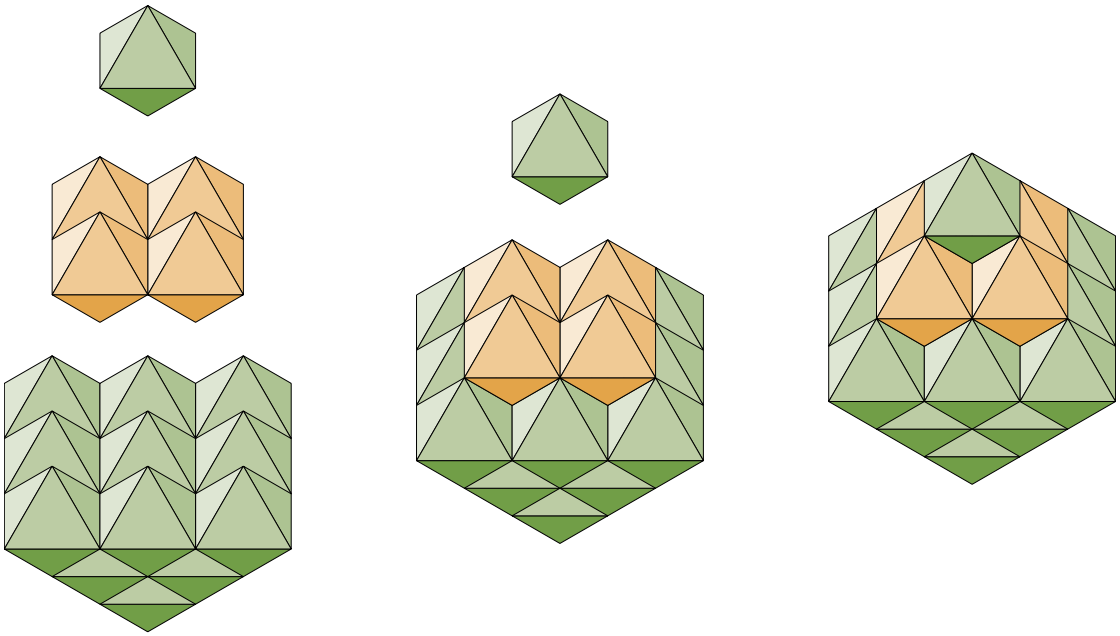

Fig. 71 GaN-group facial

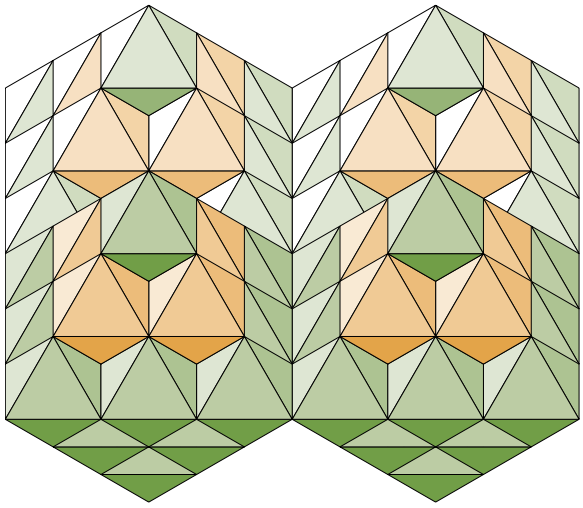

Fig. 72 GaN-crystal layer

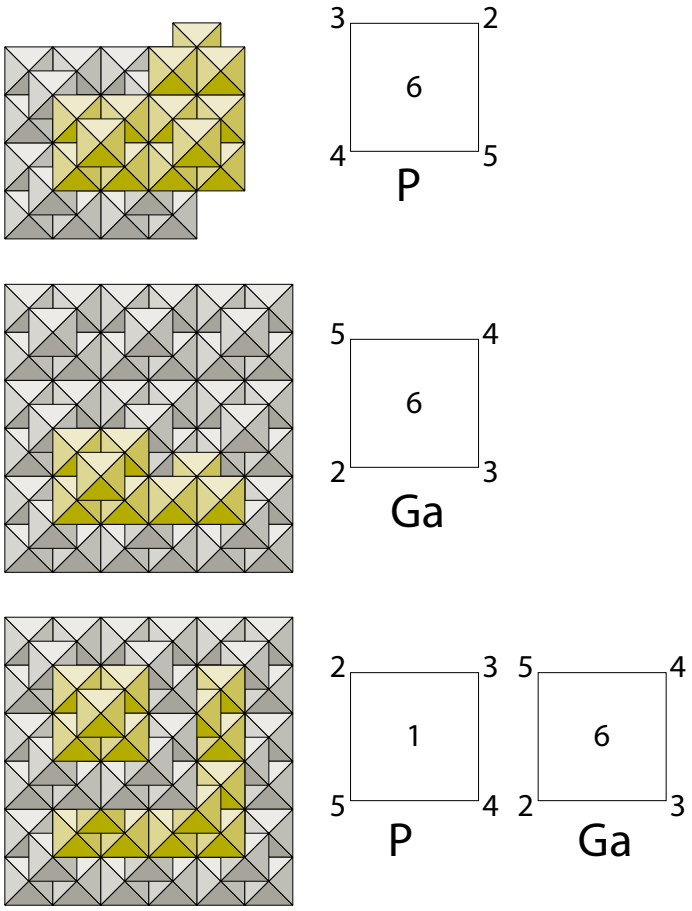

Fig. 73 GaP-group

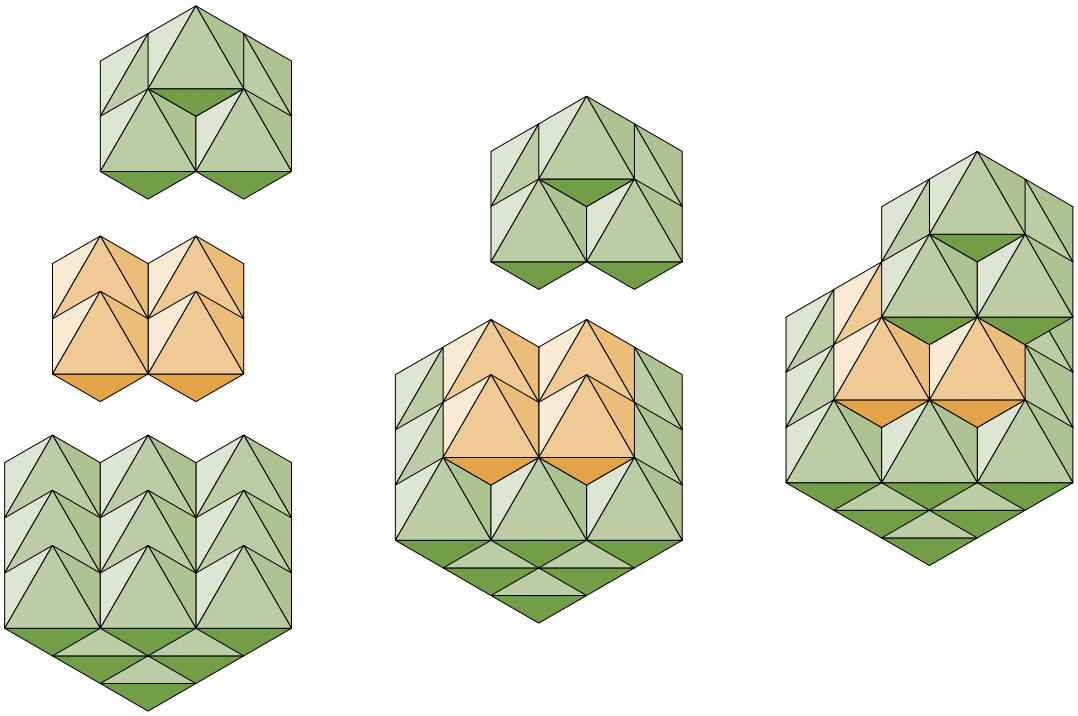

Fig. 74 GaP-group facial

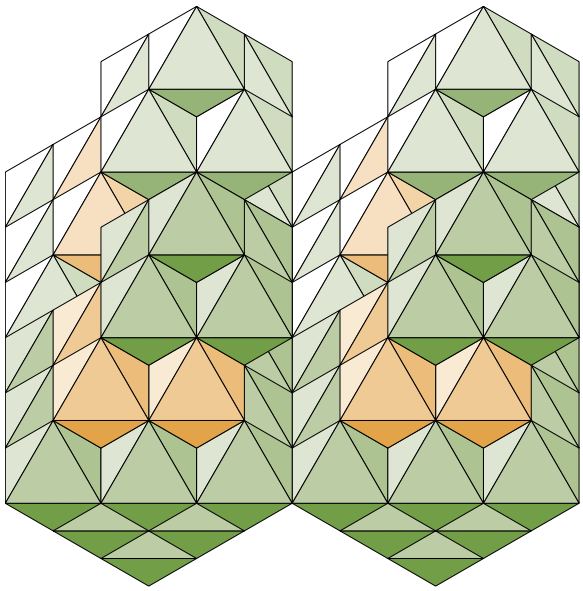

Fig. 75 GaP-crystal facial

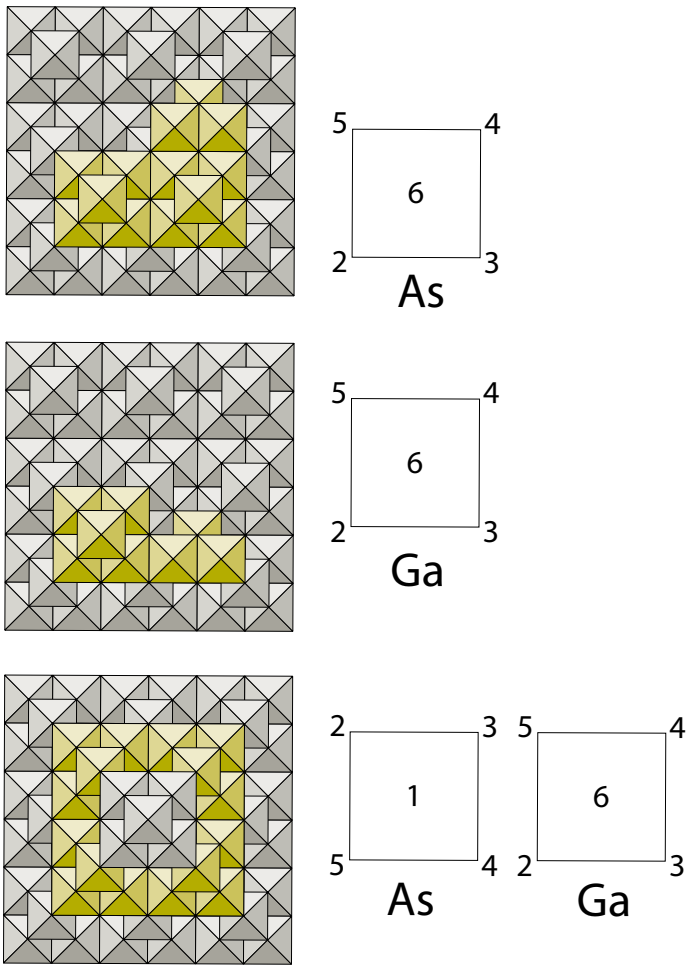

Fig. 76 GaAs-group

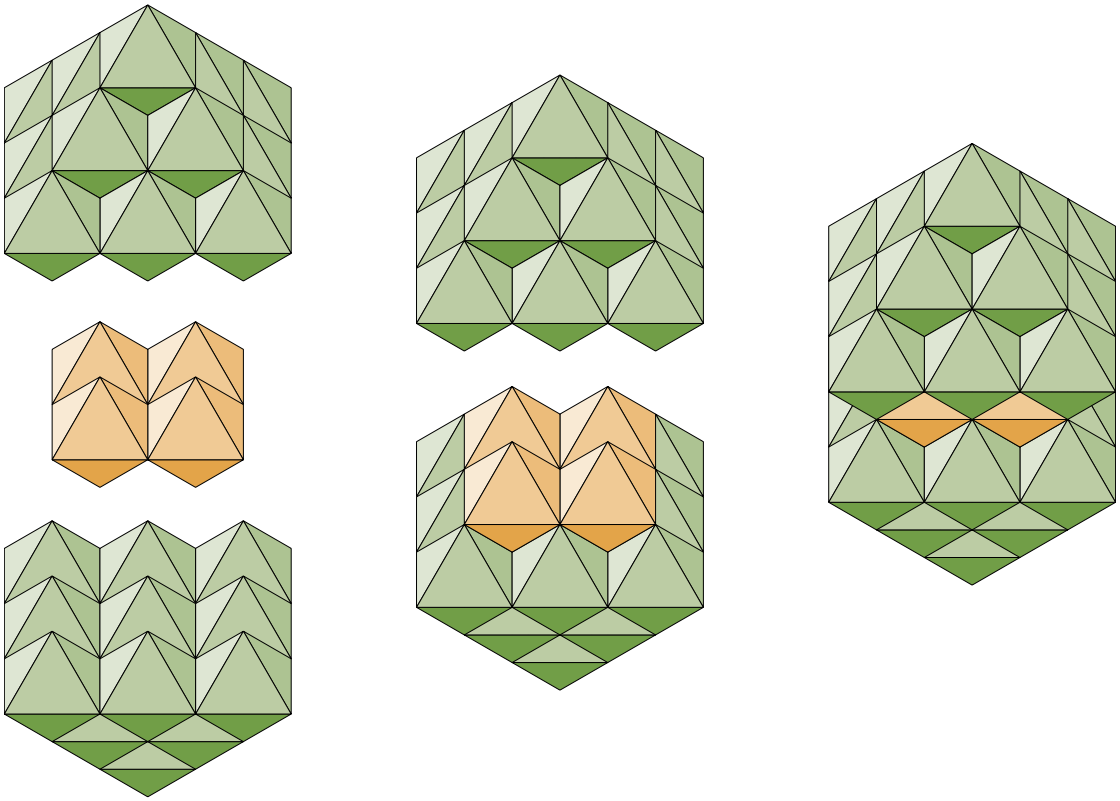

Fig. 77 GaAs-group facial

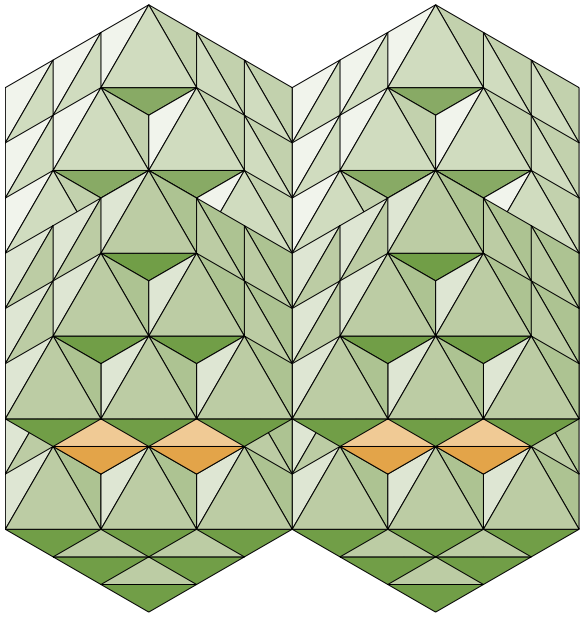

Fig. 78 GaAs crystal plane

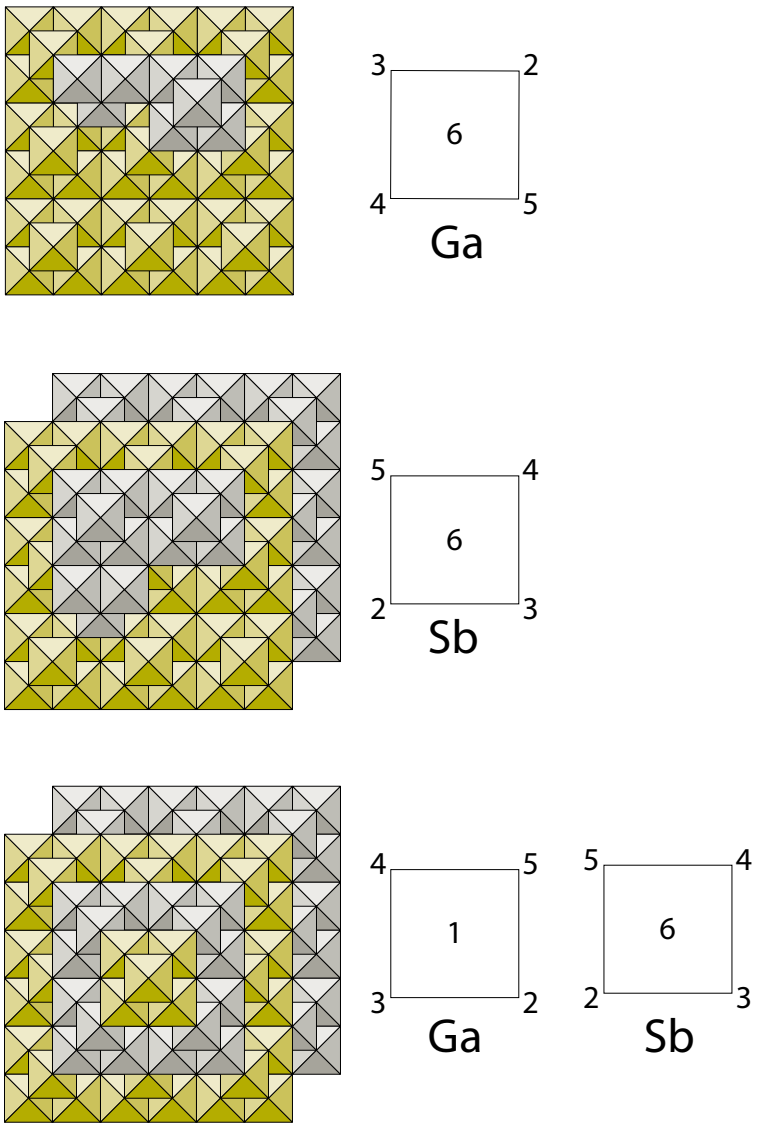

Fig. 79 GaSb-group

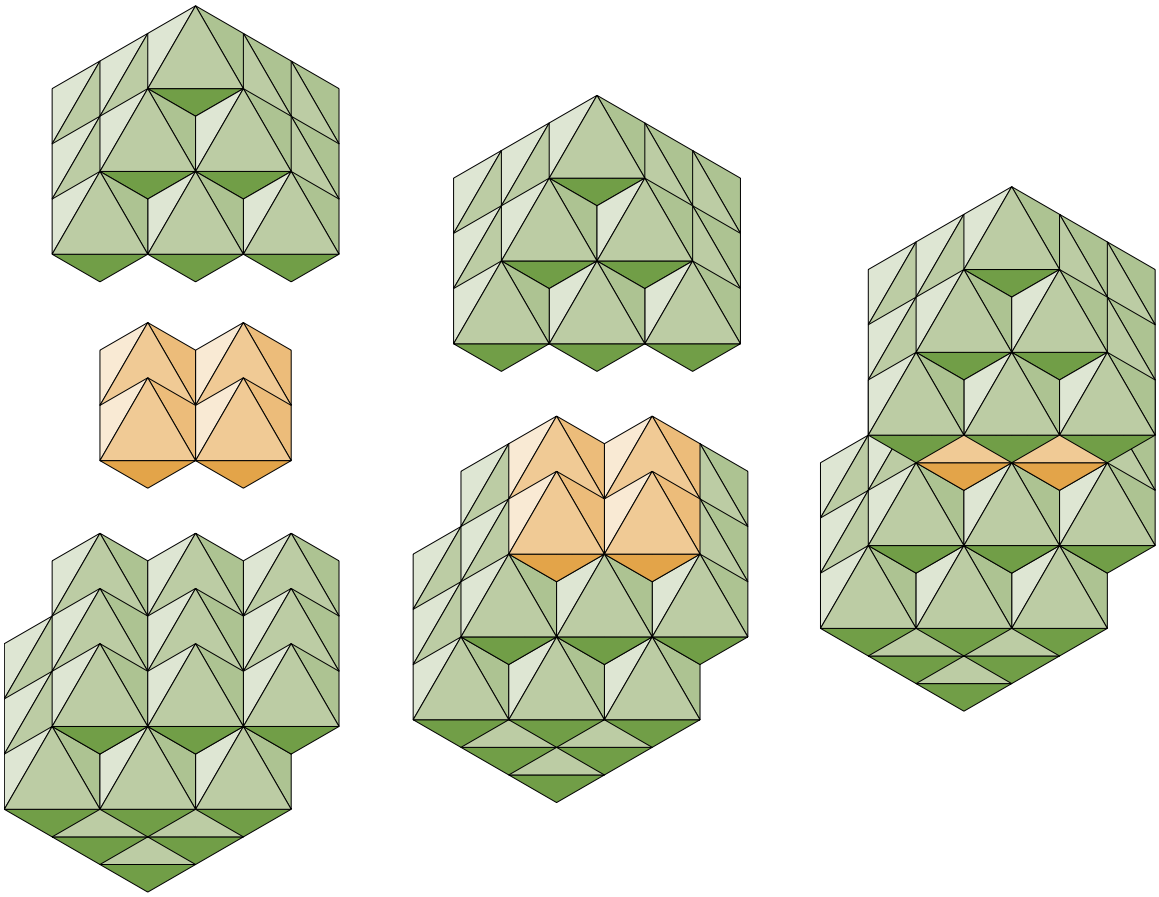

Fig. 80 GaSb-group facial

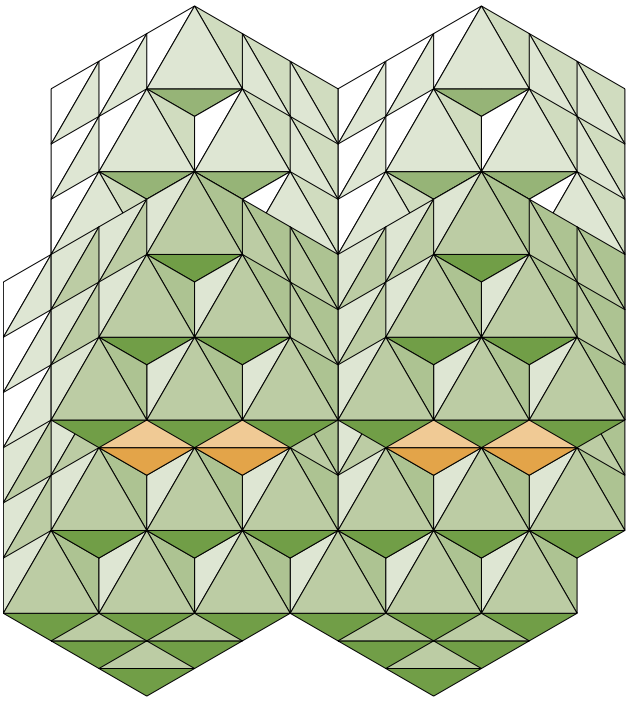

Fig. 81 GaSb-crystal layer

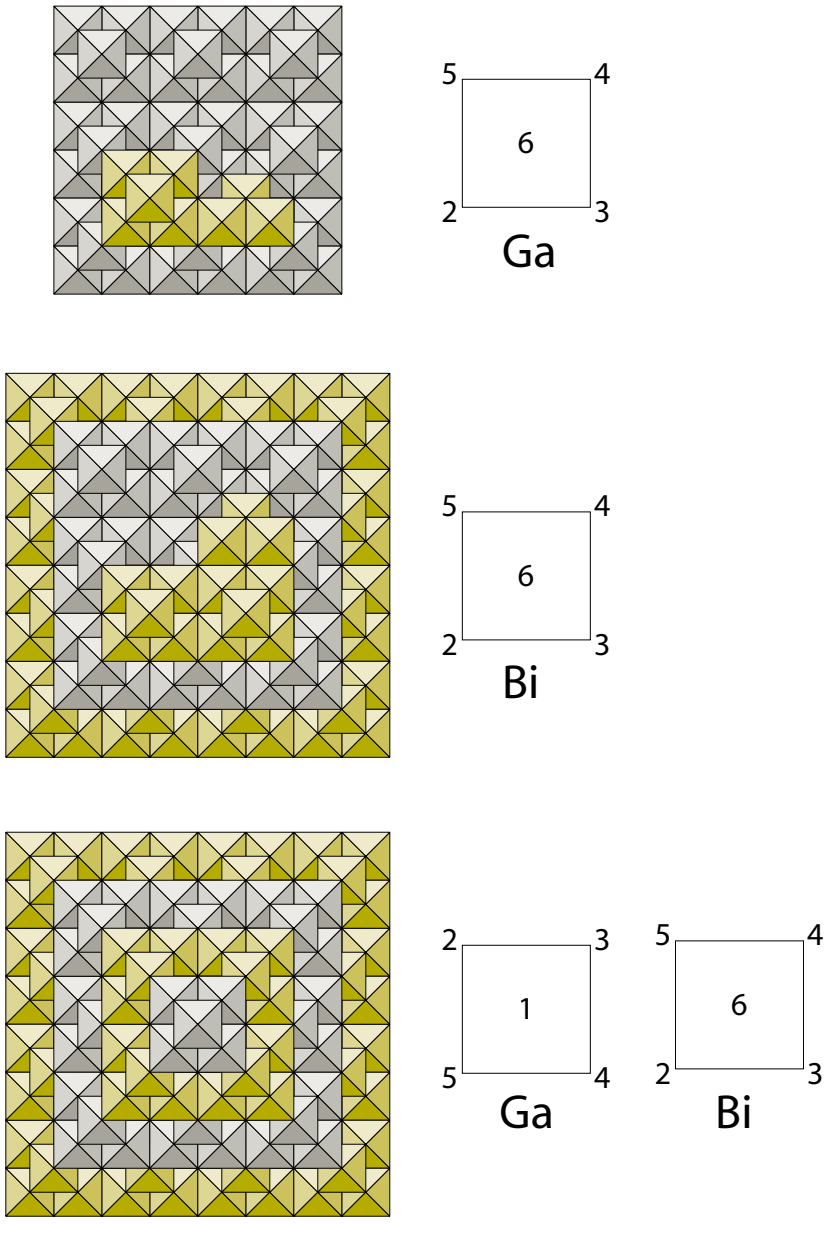

Fig. 82 GaBi-group

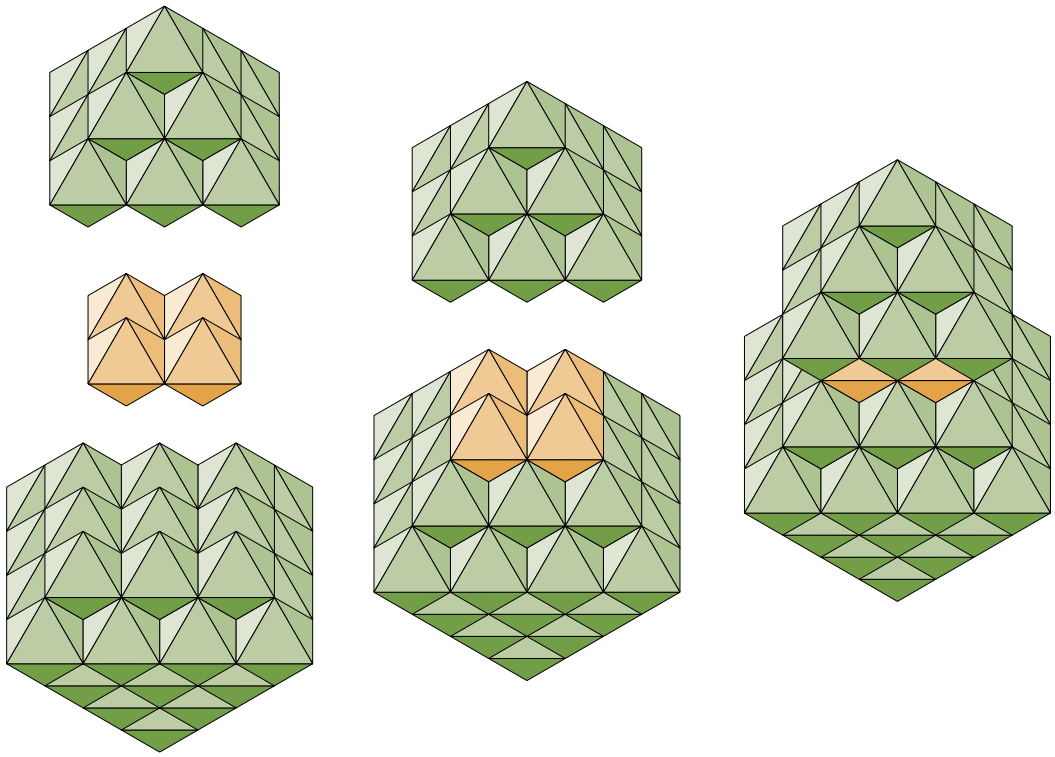

Fig. 83 GaBi-group facial

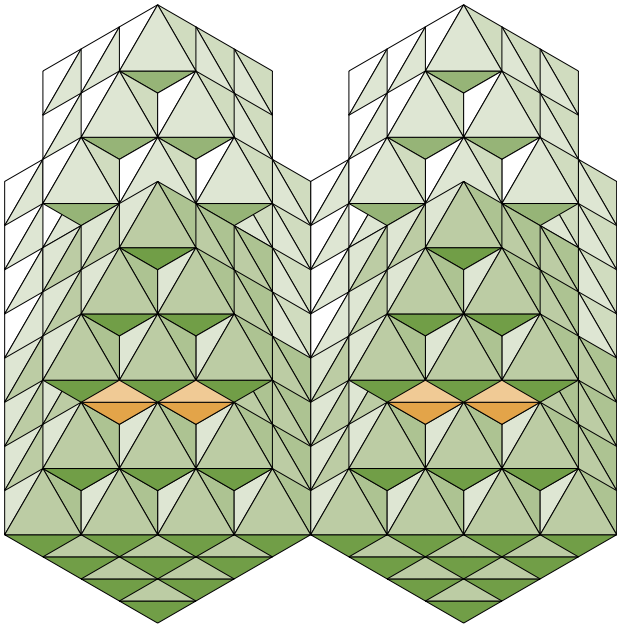

Fig. 84 GaBi-crystal layer

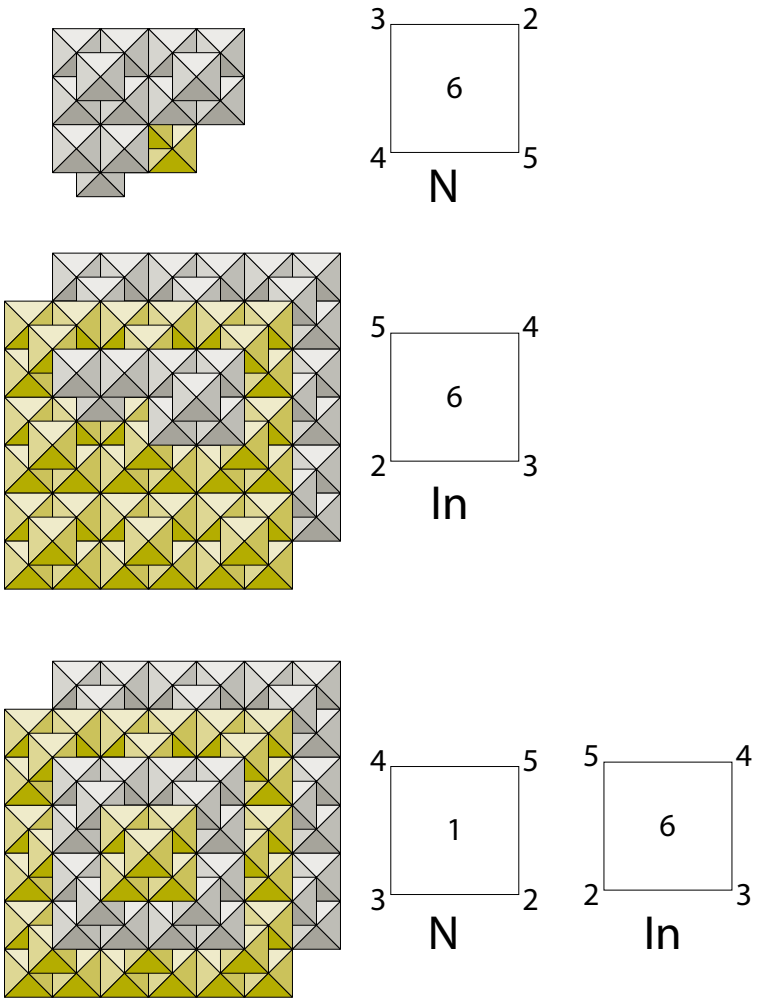

Fig. 85 InN-group
The InN-group is a Ba-atom homomorph.

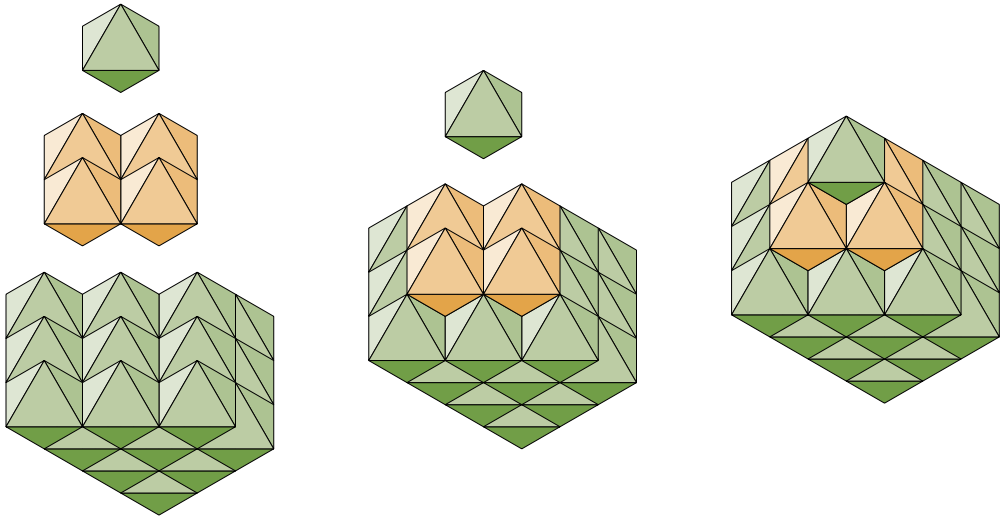

Fig. 86 InN-group facial

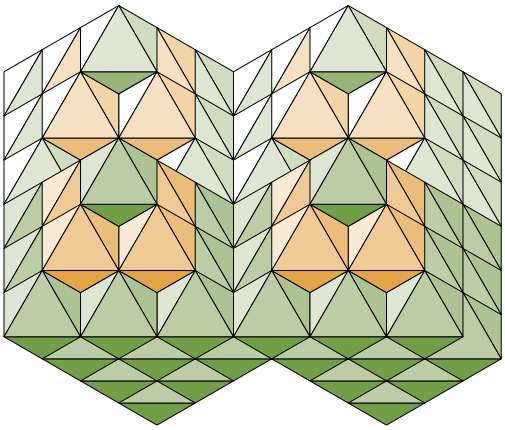

Fig. 87 InN-crystal layer

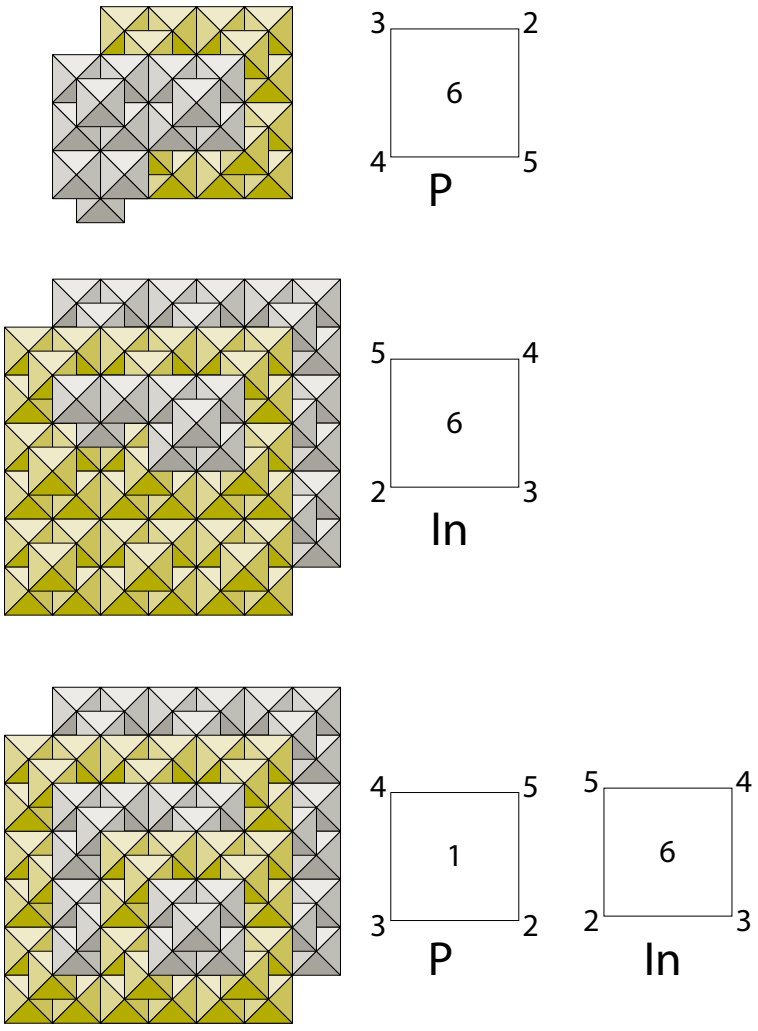

Fig. 88 InP-group

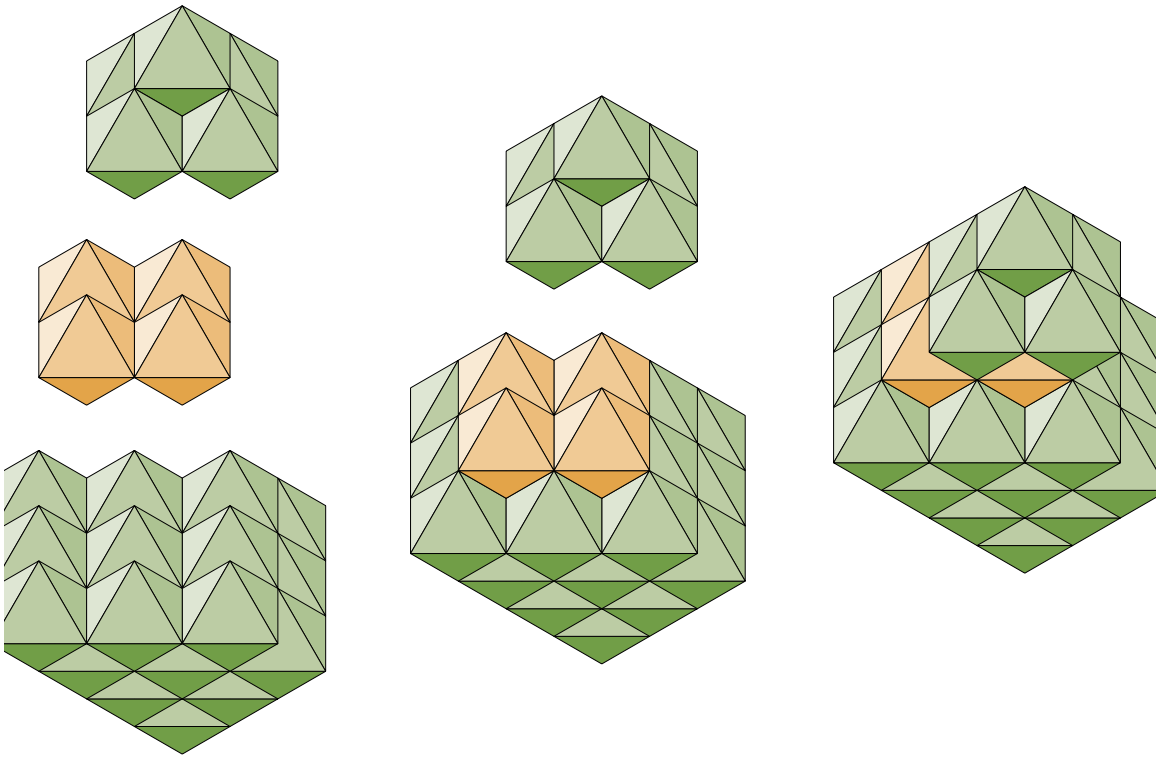

Fig. 89 InP-group facial

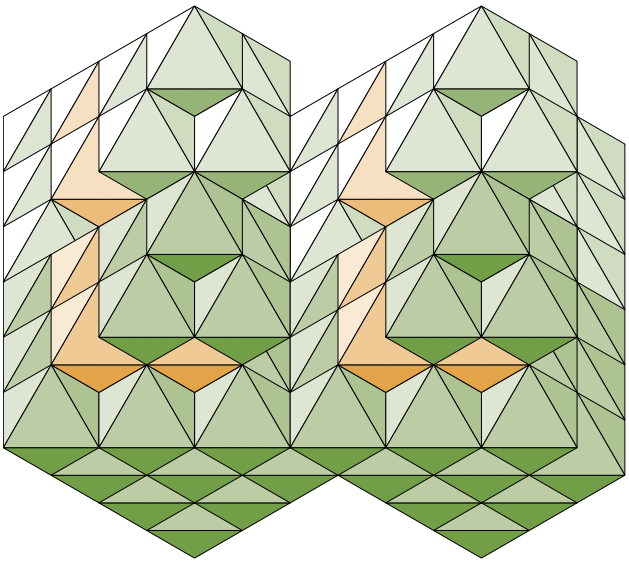

Fig. 90 InP crystal layer

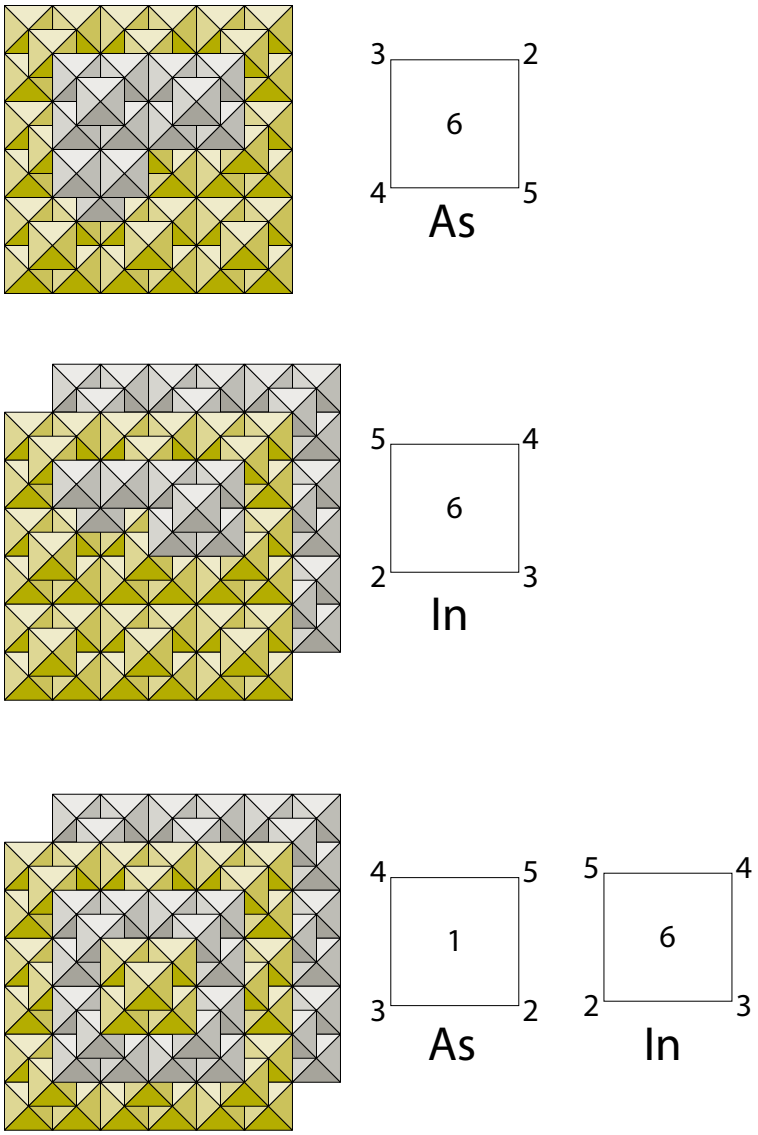

Fig. 91 InAs-group

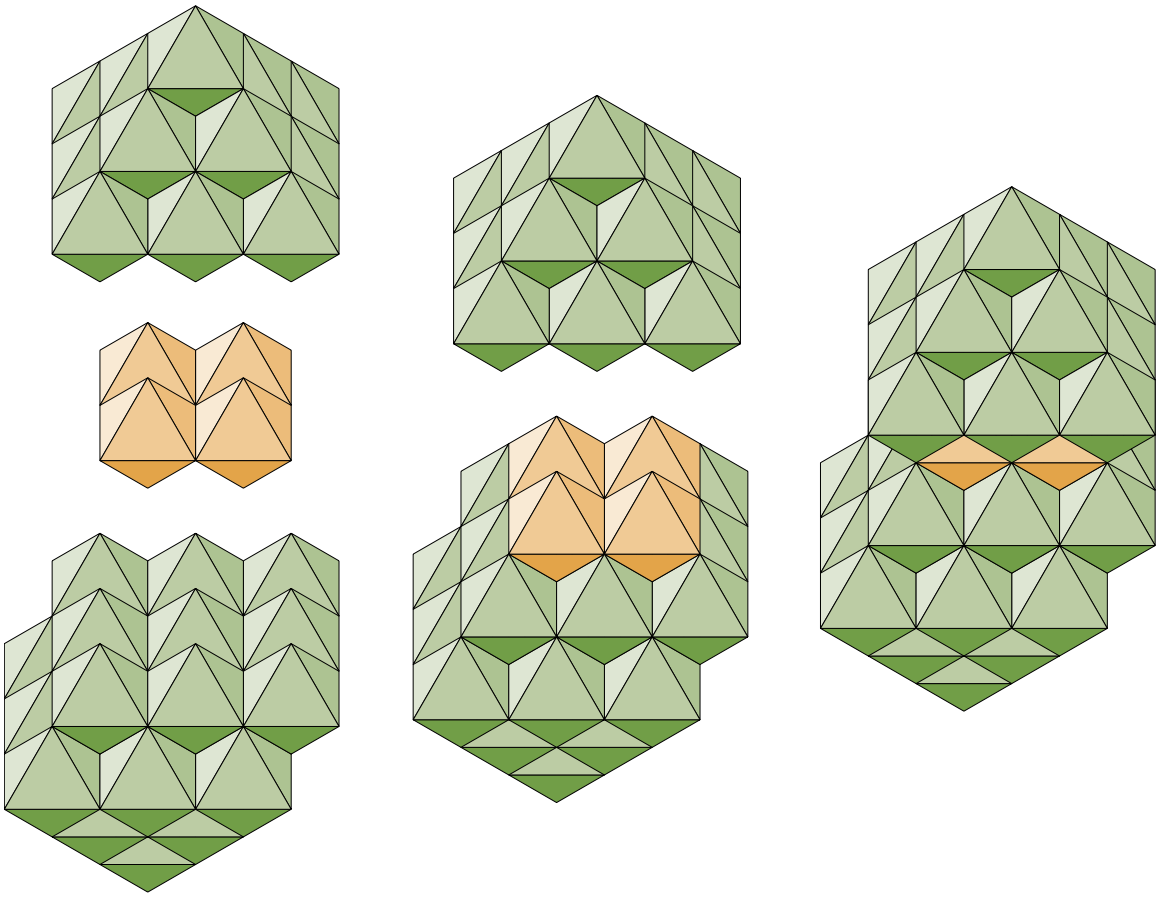

Fig. 92 InAs-group facial

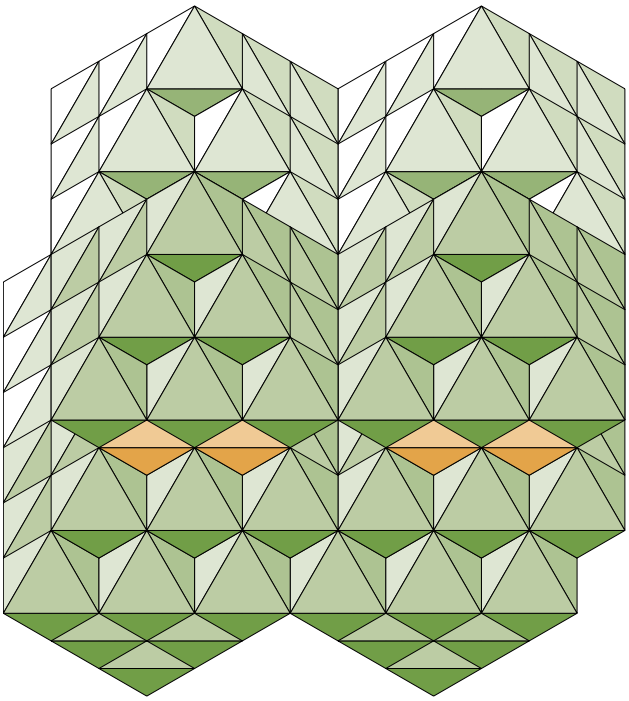

Fig. 93 InAs-crystal layer

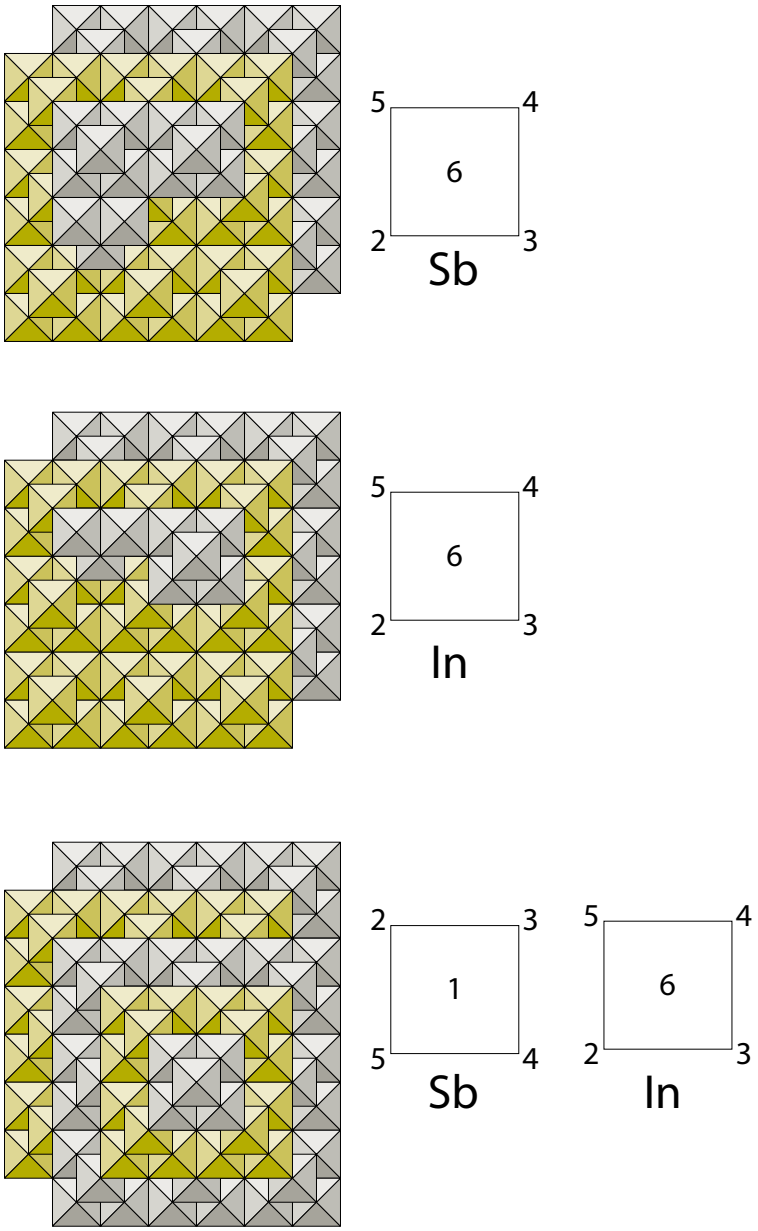

Fig. 94 InSb-group

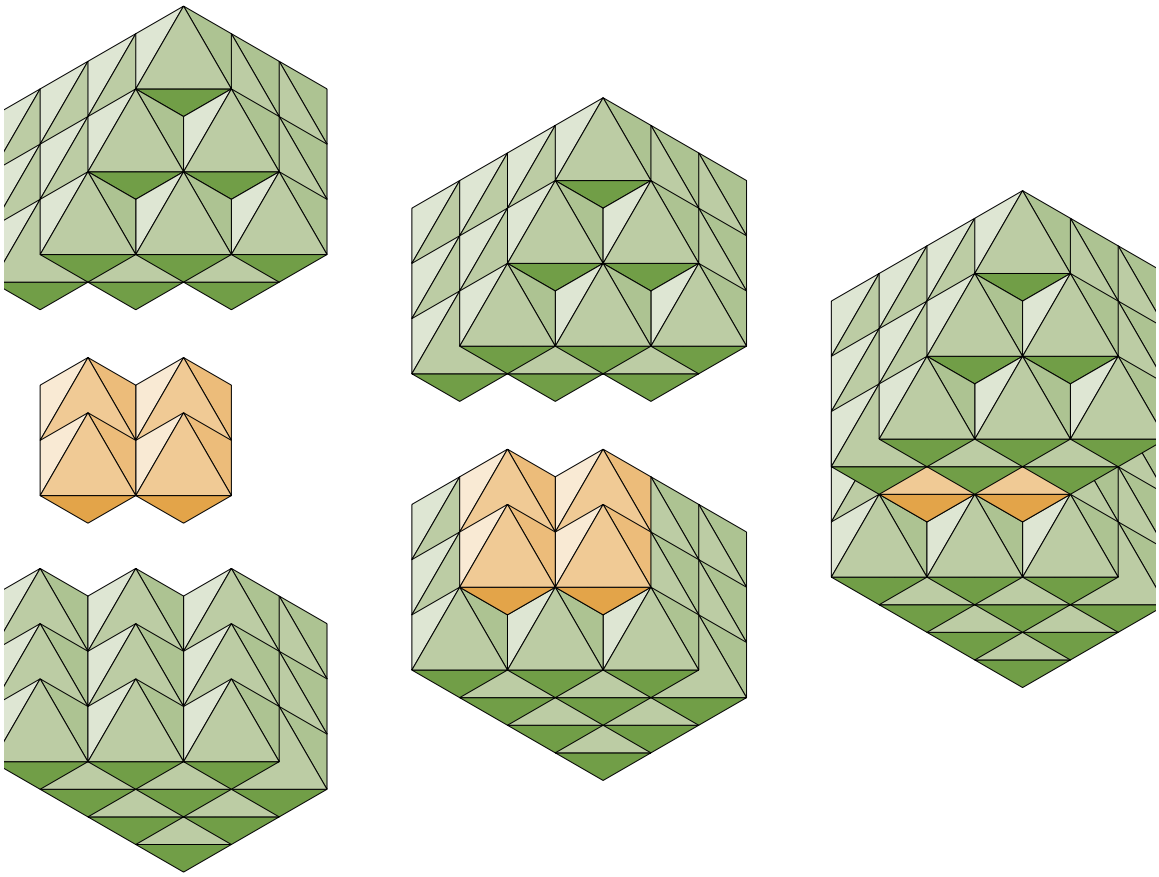

Fig. 95 InSb-group facial

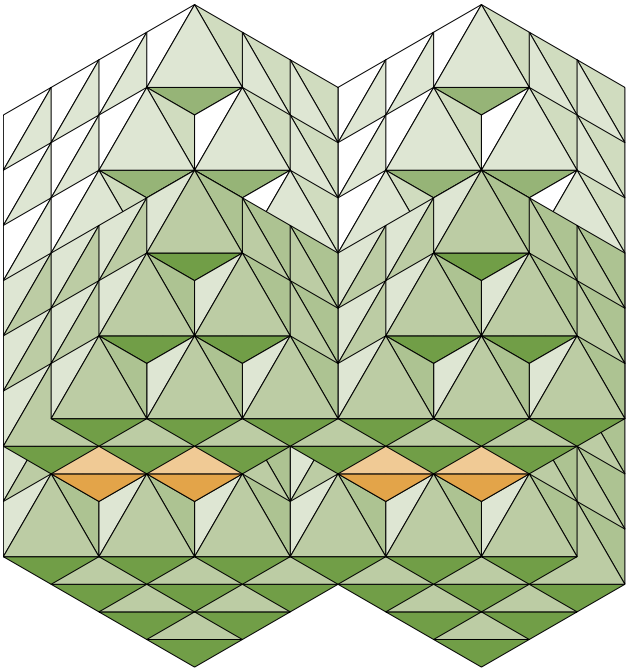

Fig. 96 InSb-crystal layer

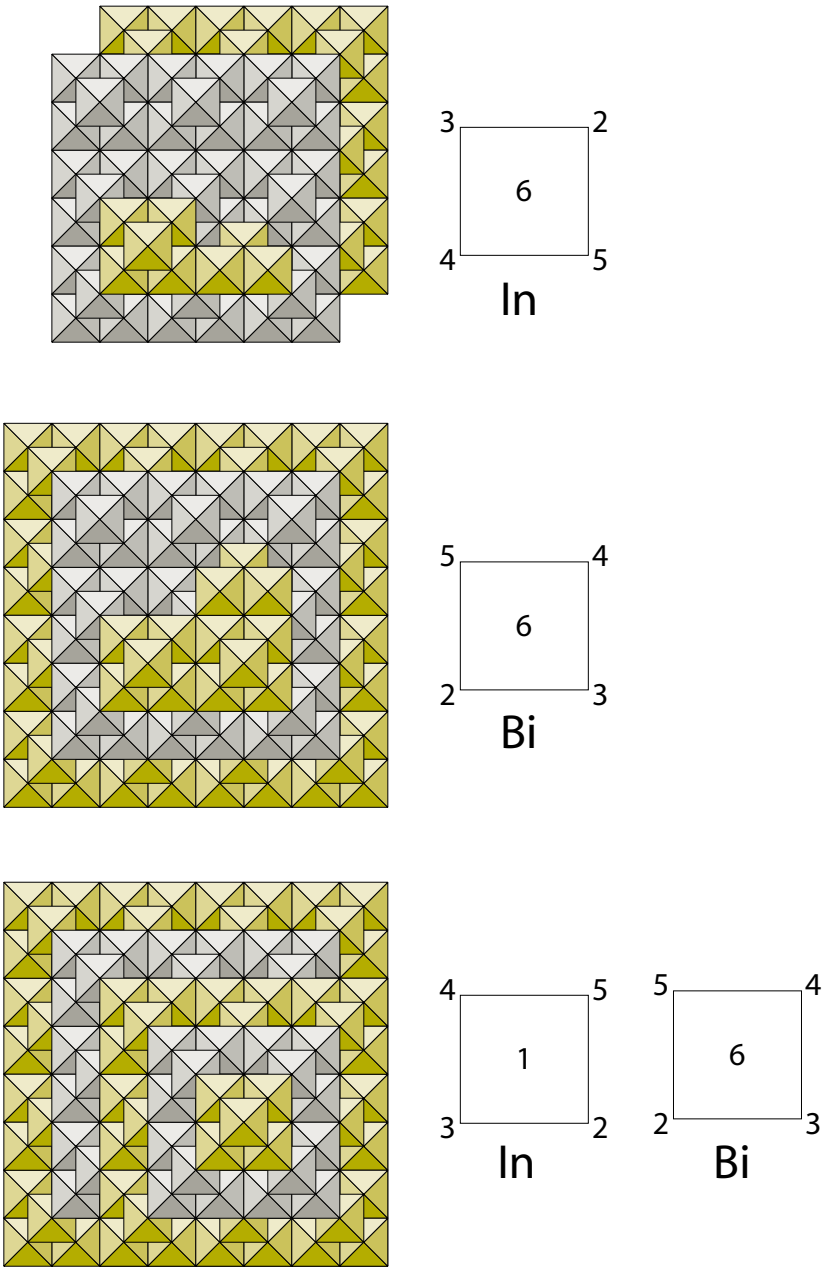

Fig. 97 InBi-group

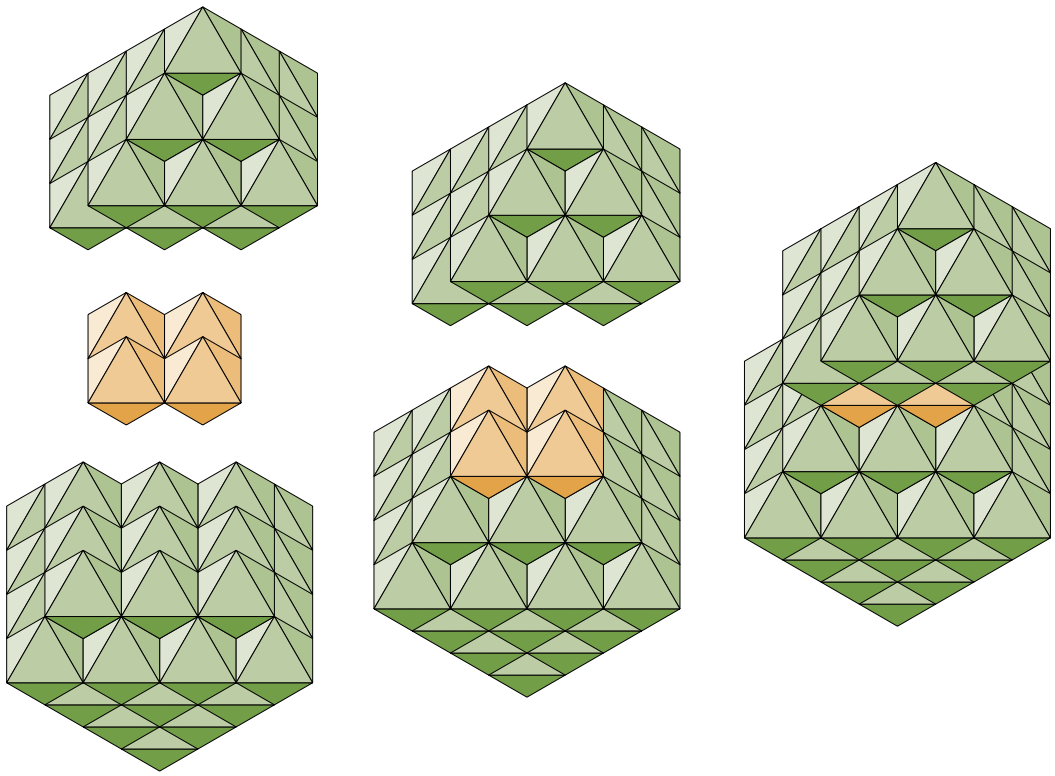

Fig. 98 InBi-group facial

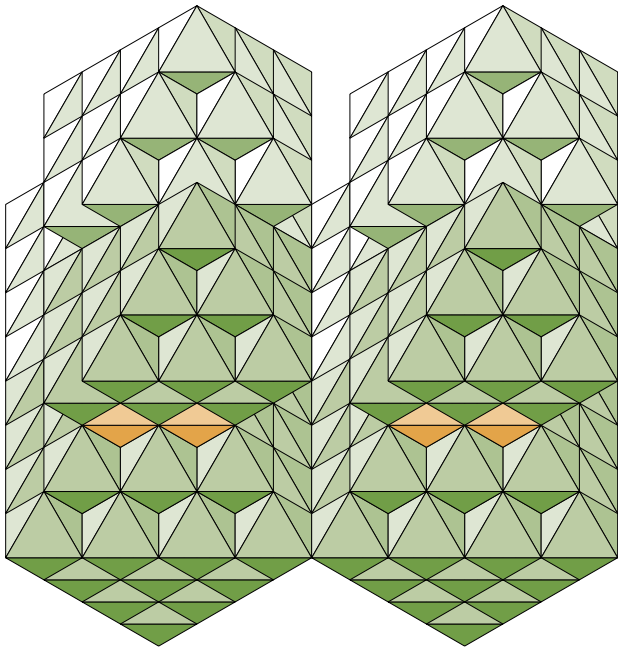

Fig. 99 InBi-crystal layer

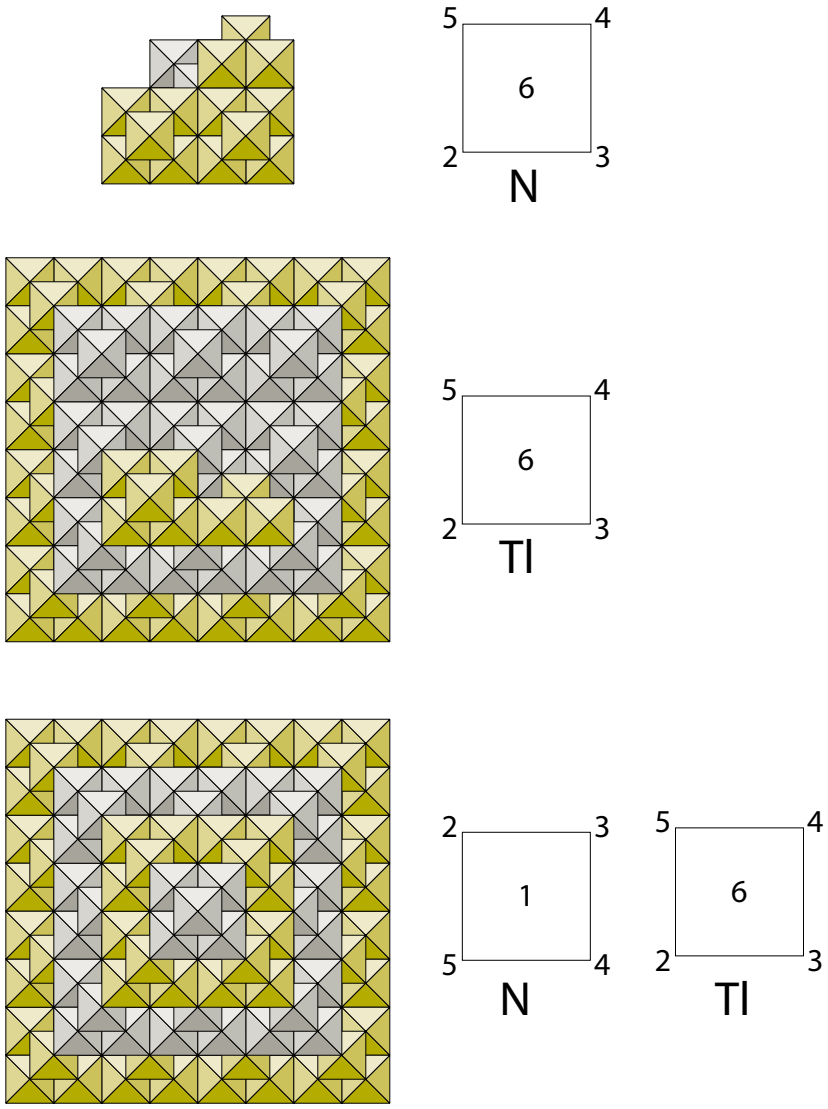

Fig. 100 TlN-group

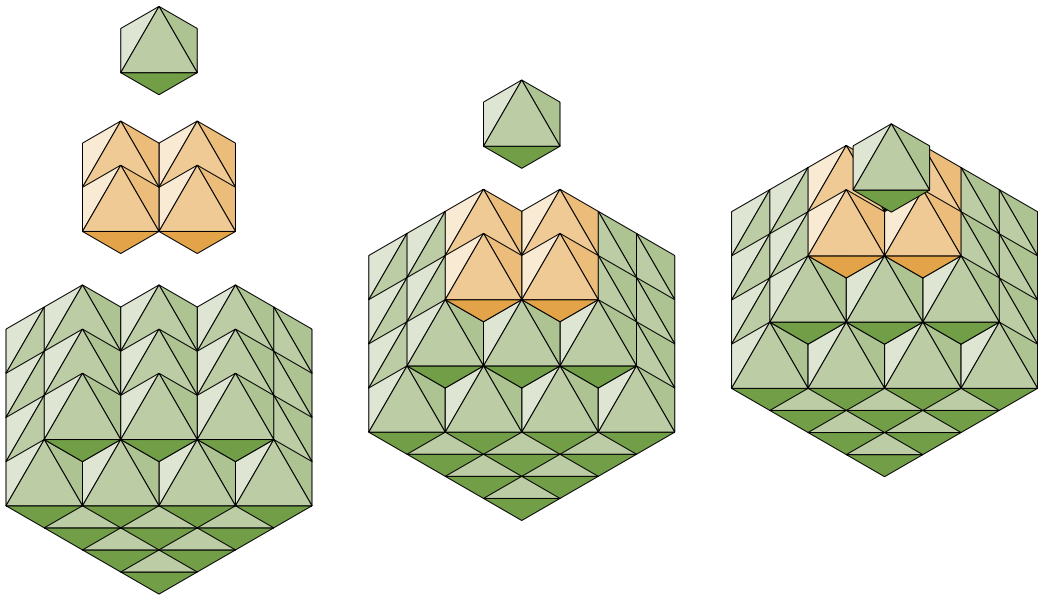

Fig. 101 TlN-group facial

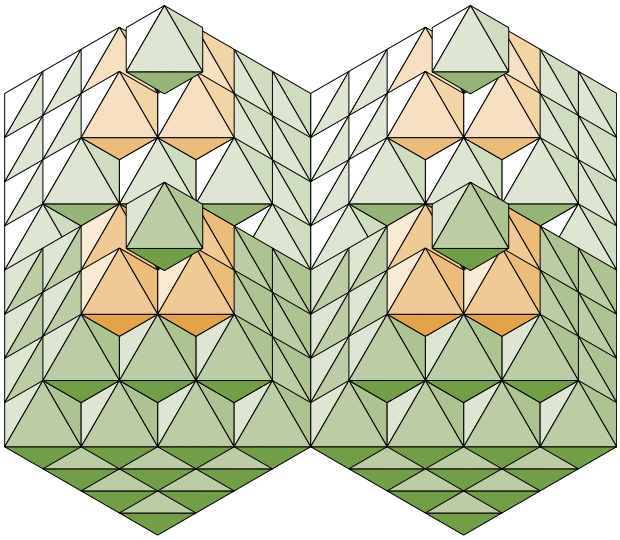

Fig. 102 TlN-crystal layer

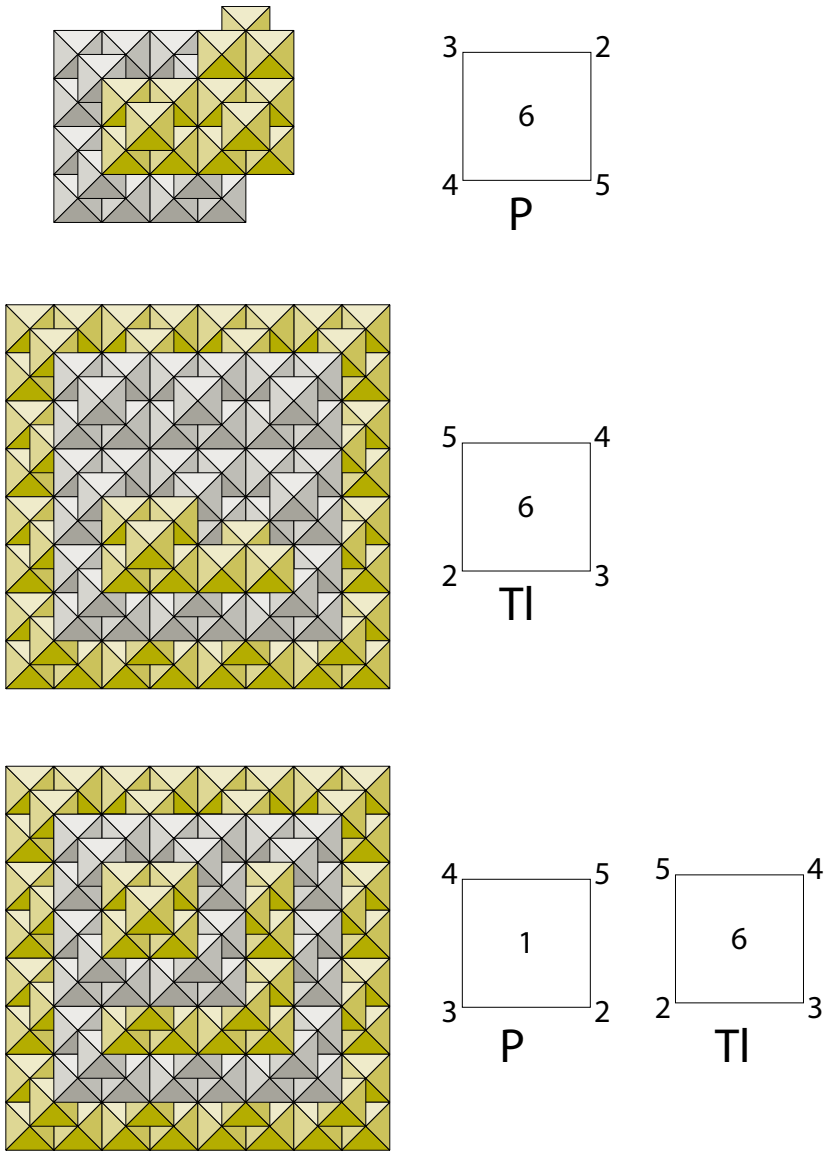

Fig. 103 TlP-group

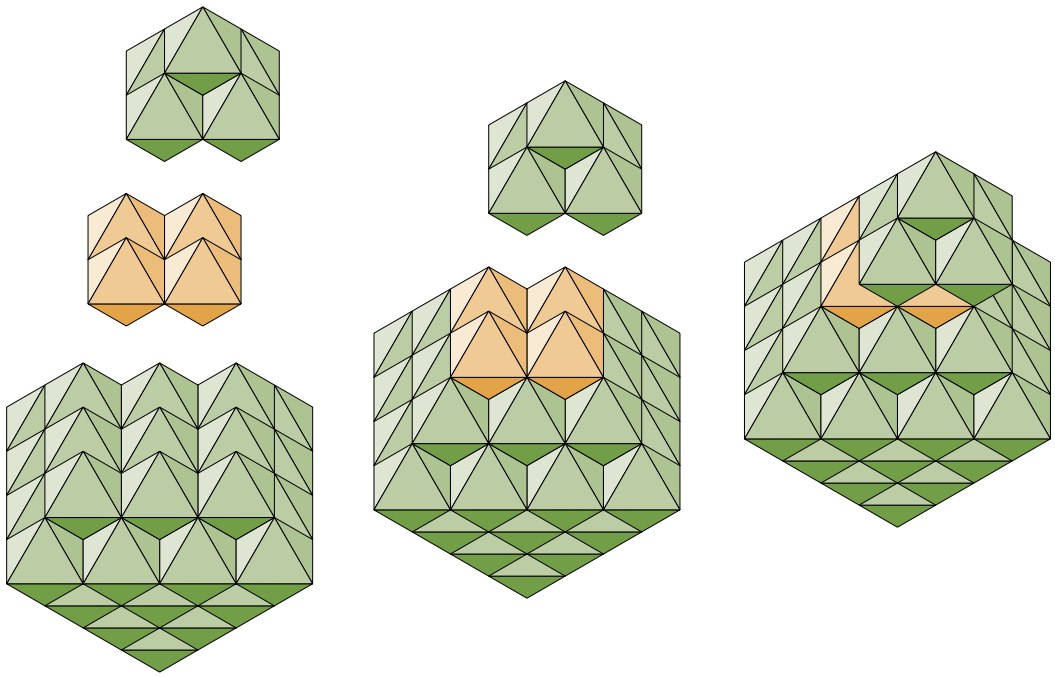

Fig. 104 TlP-group facial

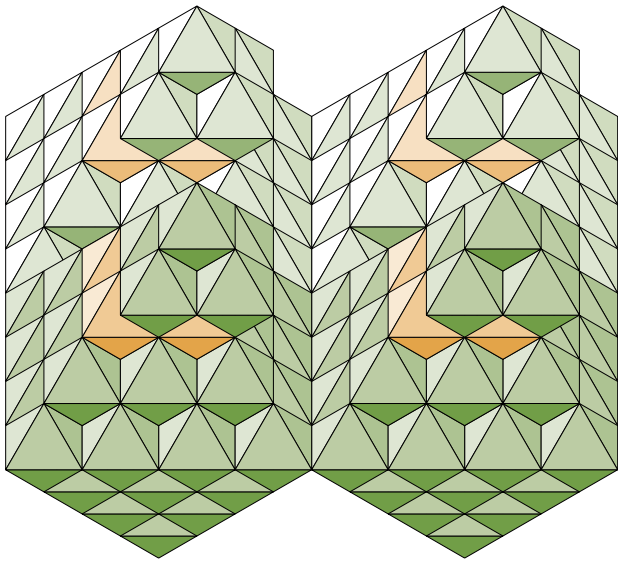

Fig. 105 TlP-crystal layer

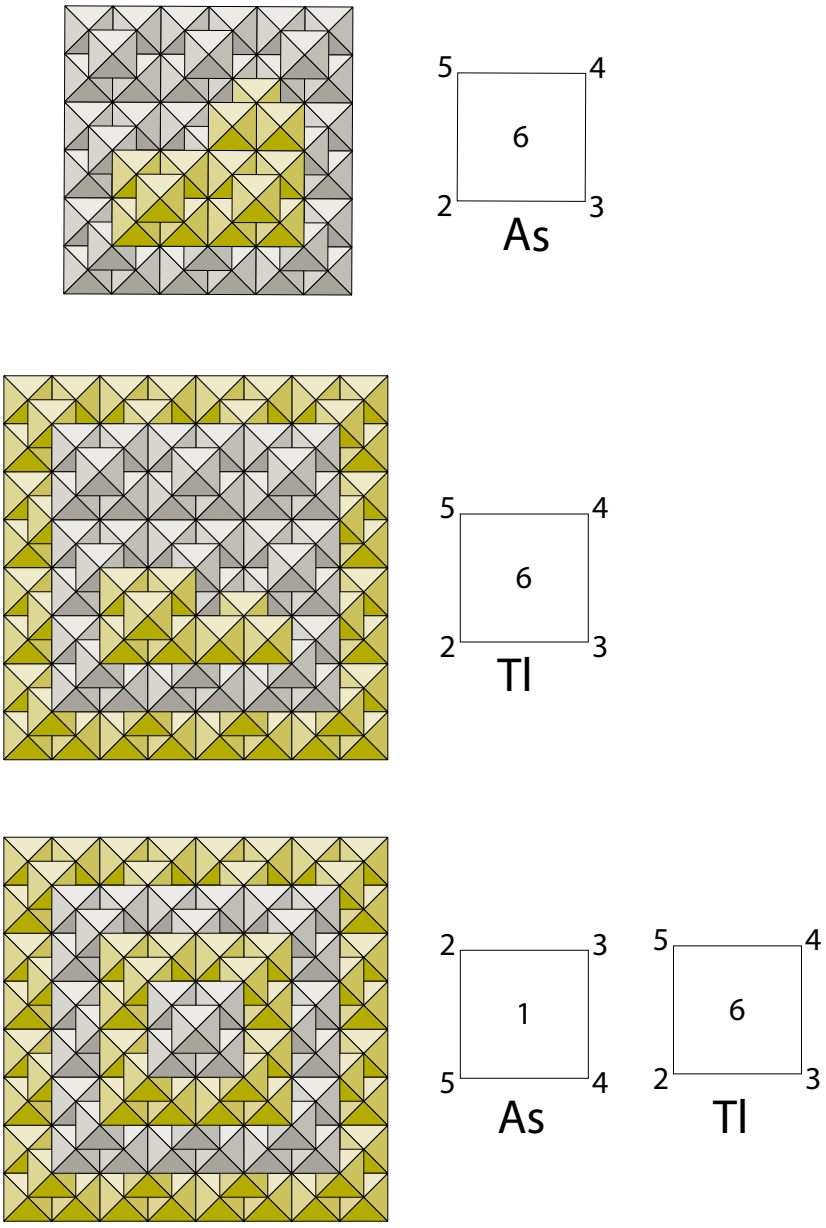

Fig. 106 TlAs-group

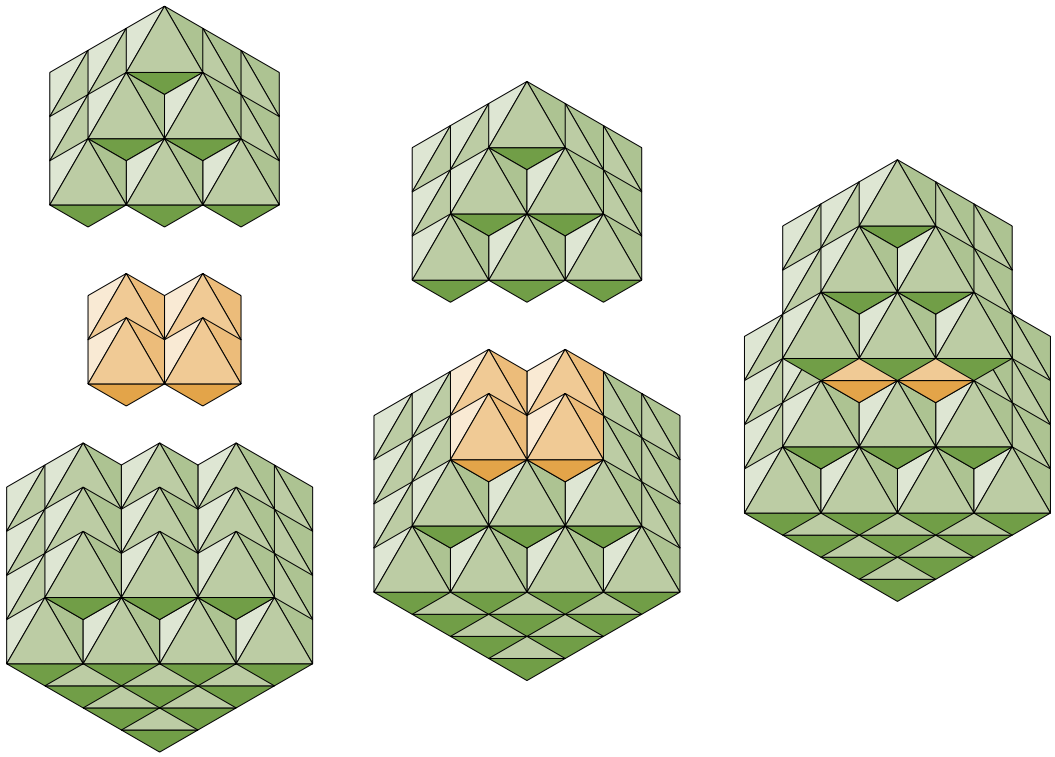

Fig. 107 TlAs-group facial

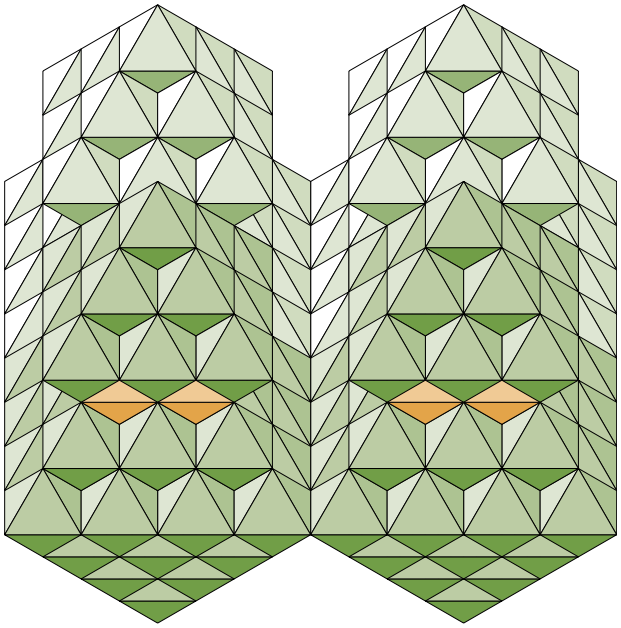

Fig. 108 TlAs-crystal layer

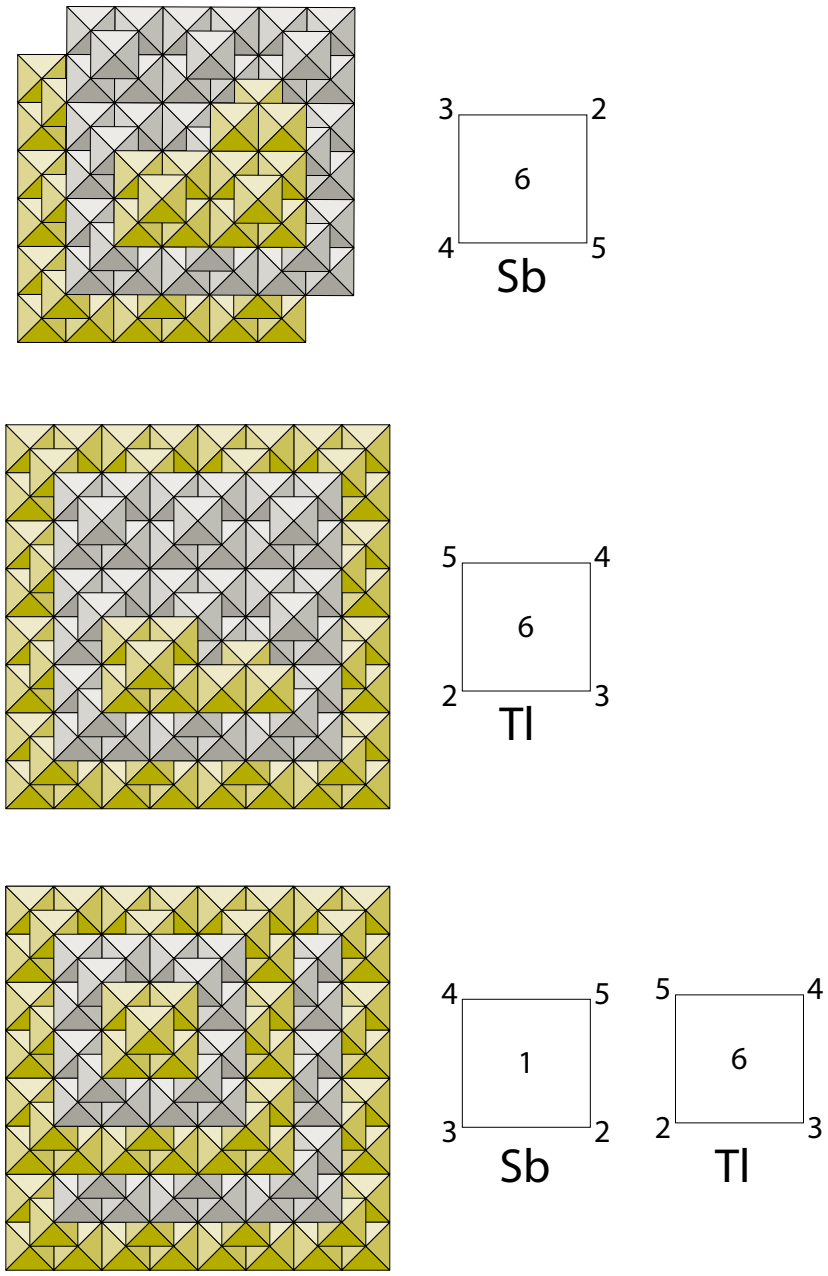

Fig. 109 TlSb-group

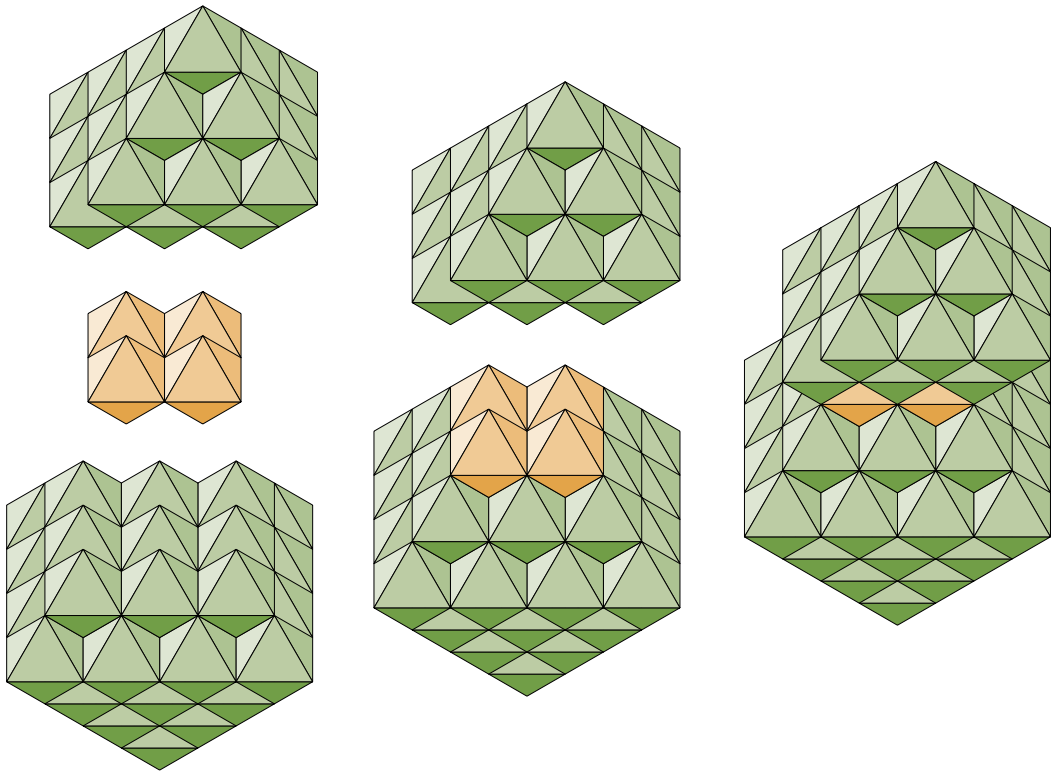

Fig. 110 TlSb-group facial

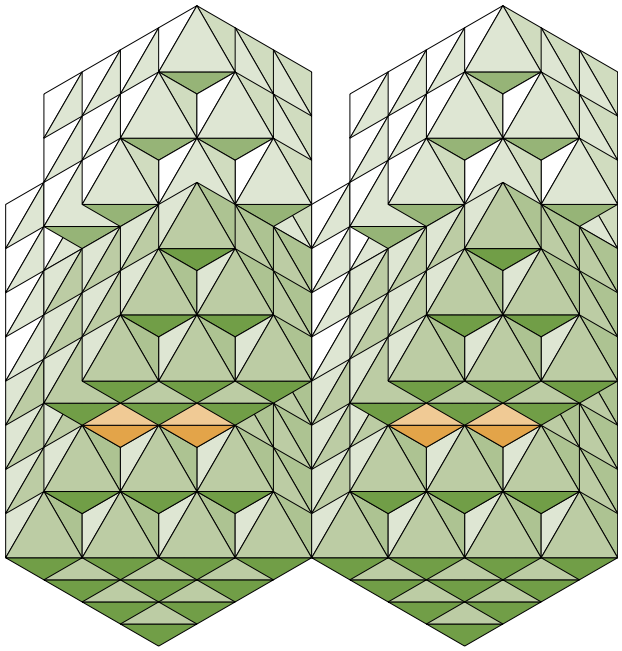

Fig. 111 TlSb-crystal layer

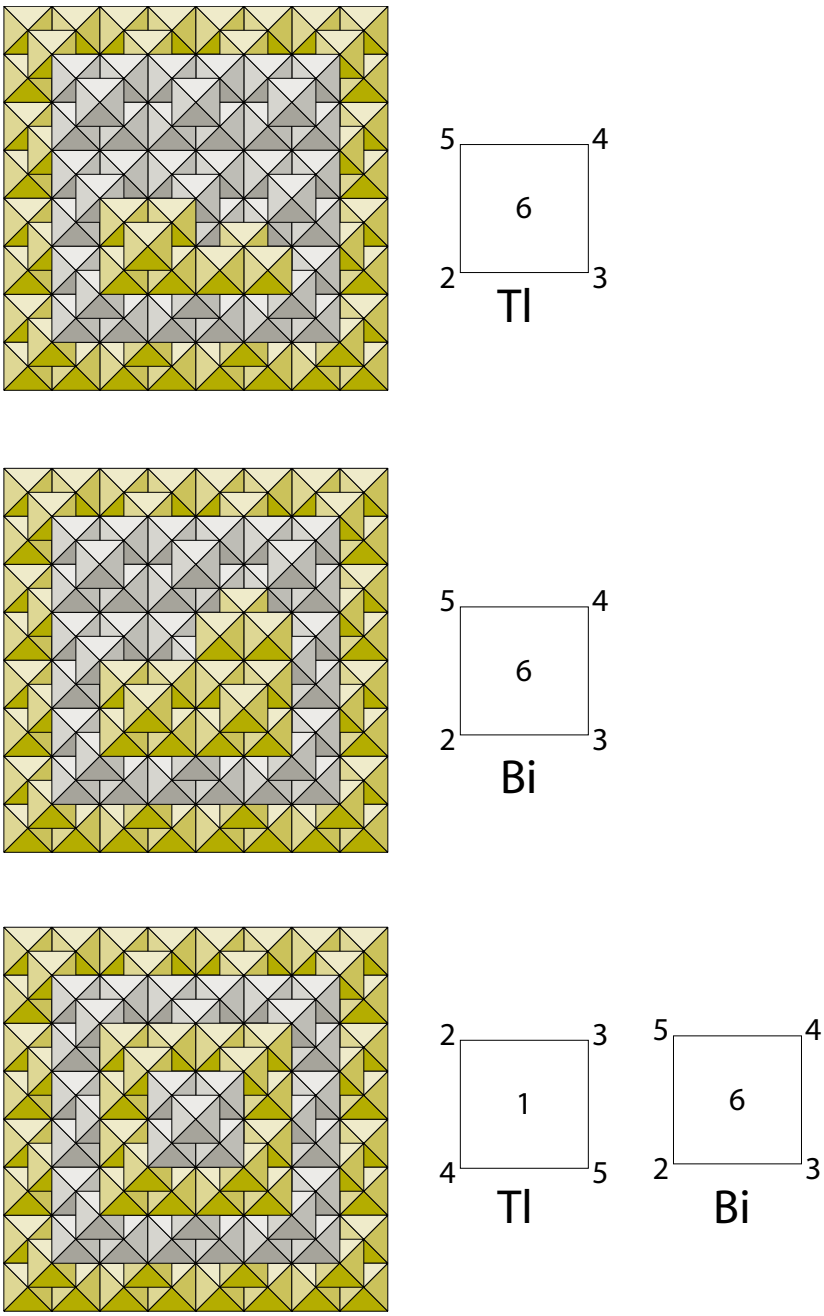

Fig. 112 BiTl-group

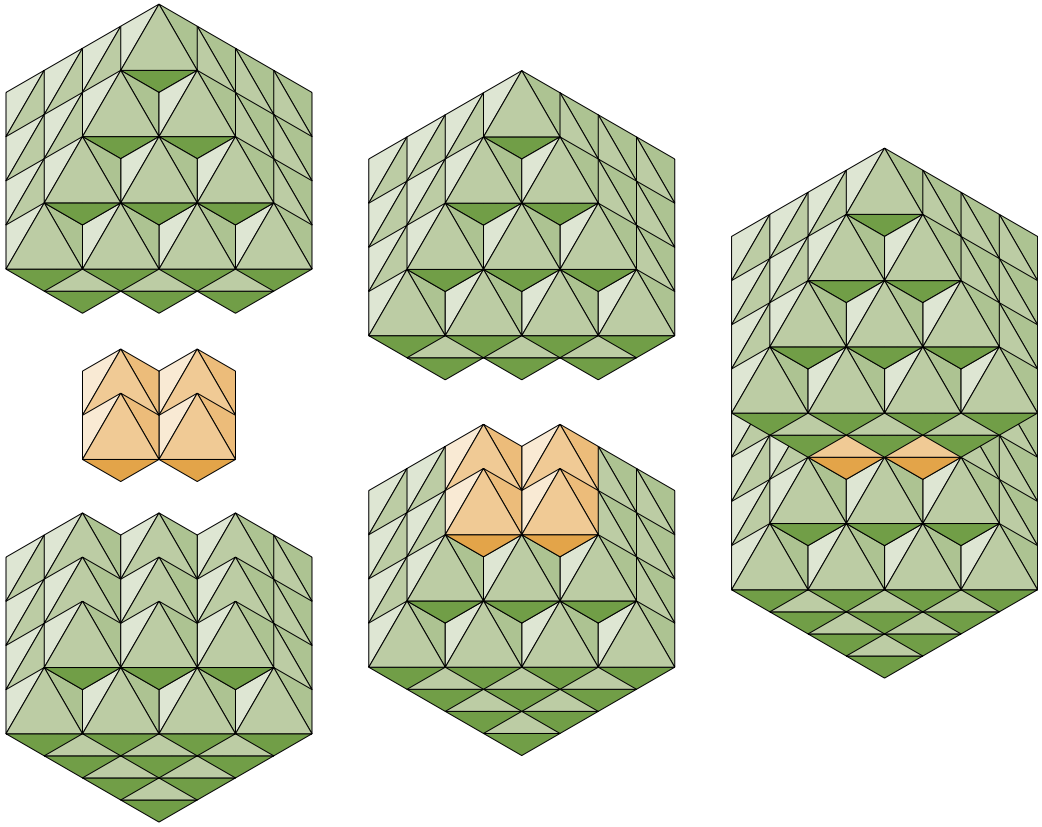

Fig. 113 BiTl facial

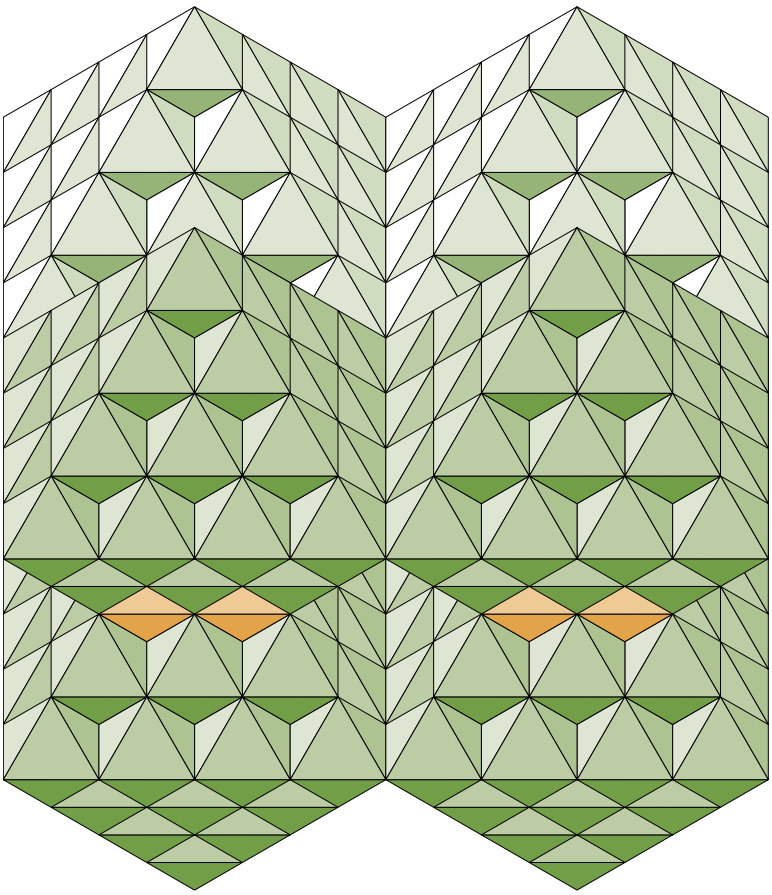

Fig. 114 BiTl crystal

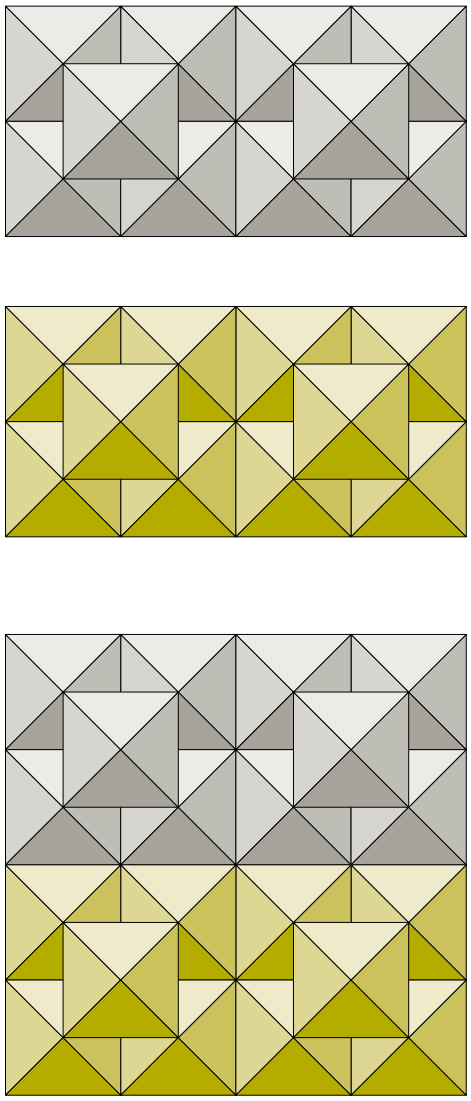

Fig. 115 Two plus two–layer

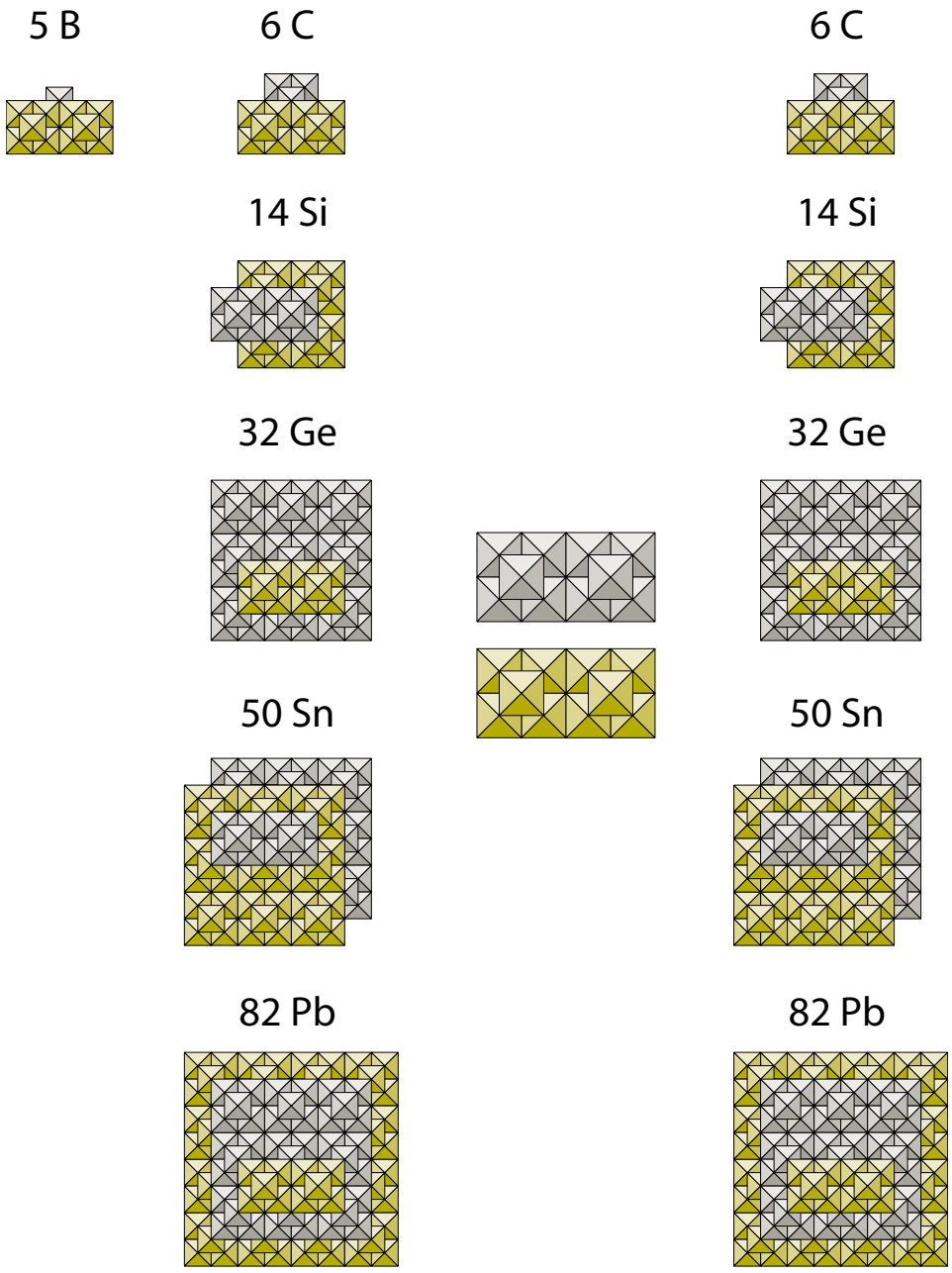

Fig. 116 Two plus two–elements

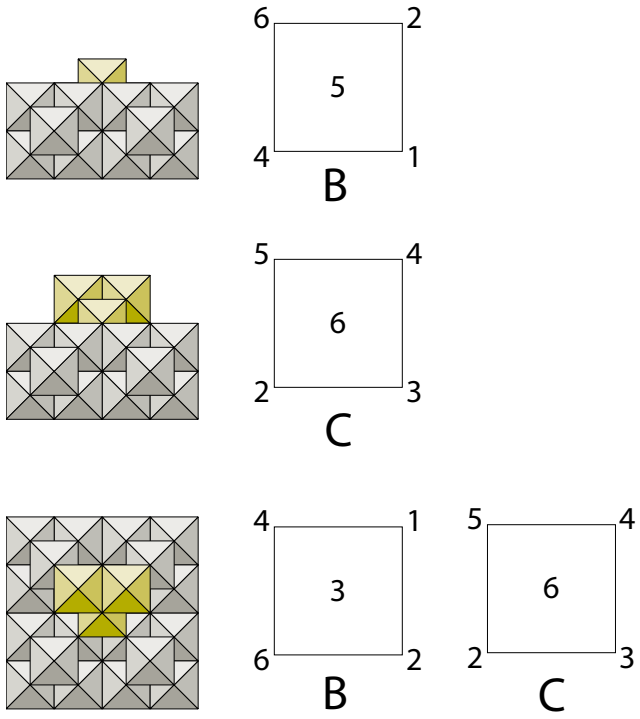

Fig. 117 BC-group

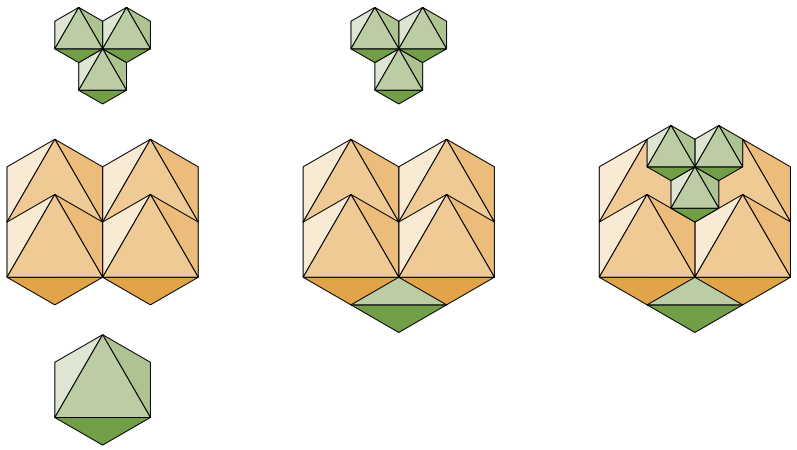

Fig. 118 BC-group facial

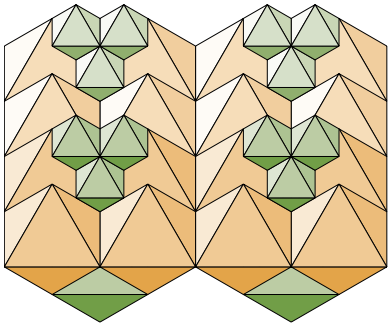

Fig. 119 BC-crystal layer

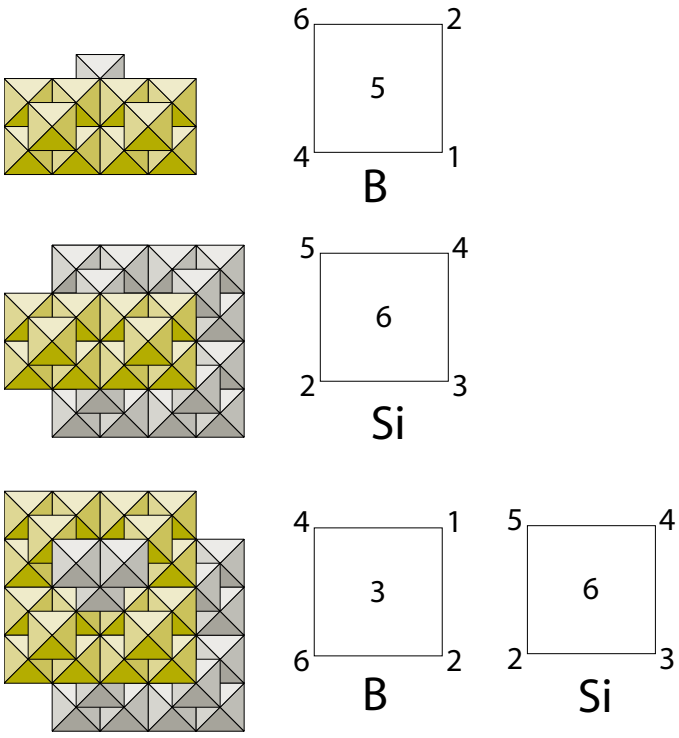

Fig. 120 BSi-group

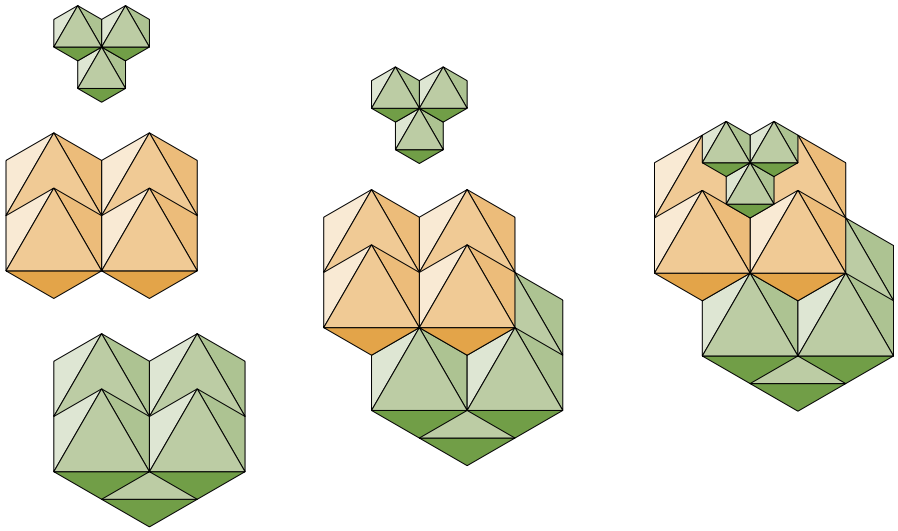

Fig. 121 BSi-group

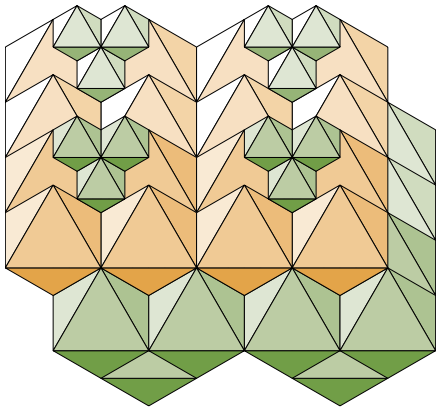

Fig. 122 BSi-crystal layer

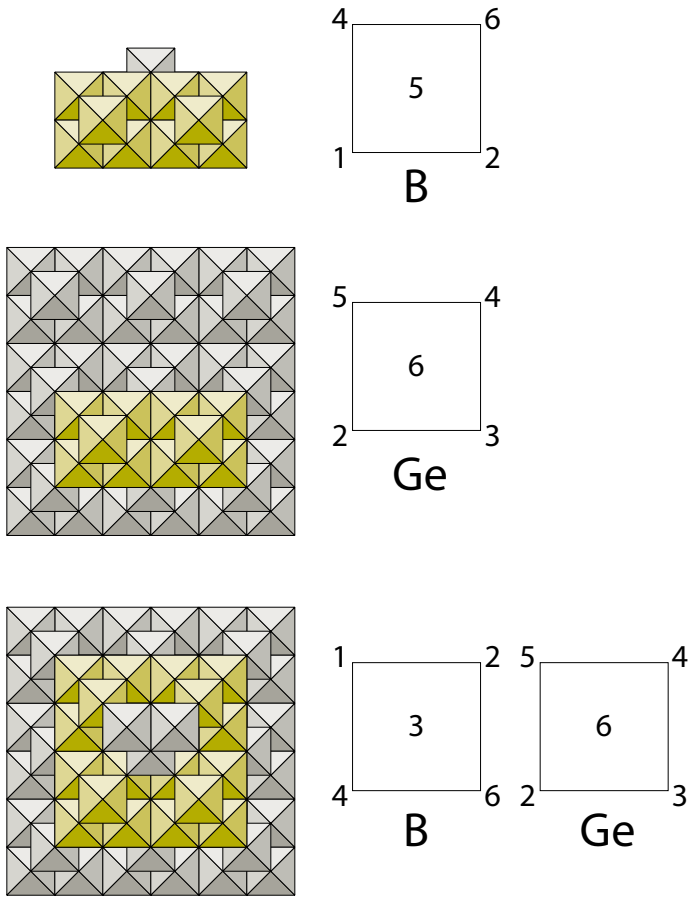

Fig. 123 BGe-group

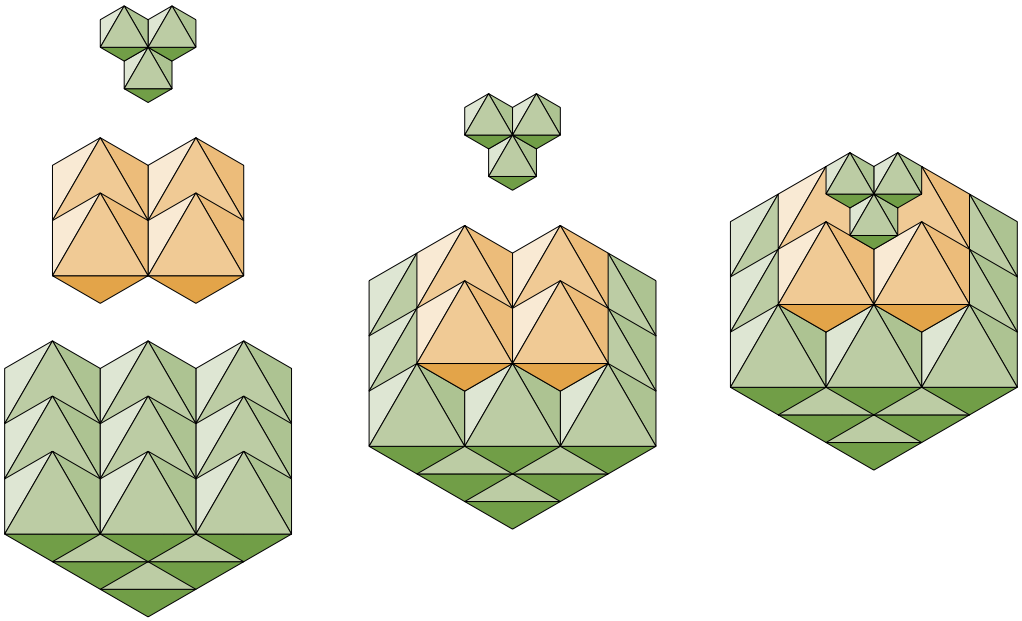

Fig. 124 BGe-group facial

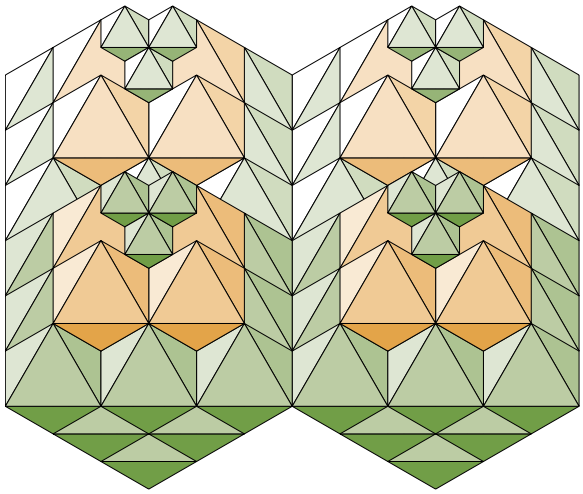

Fig. 125 BGe crystal

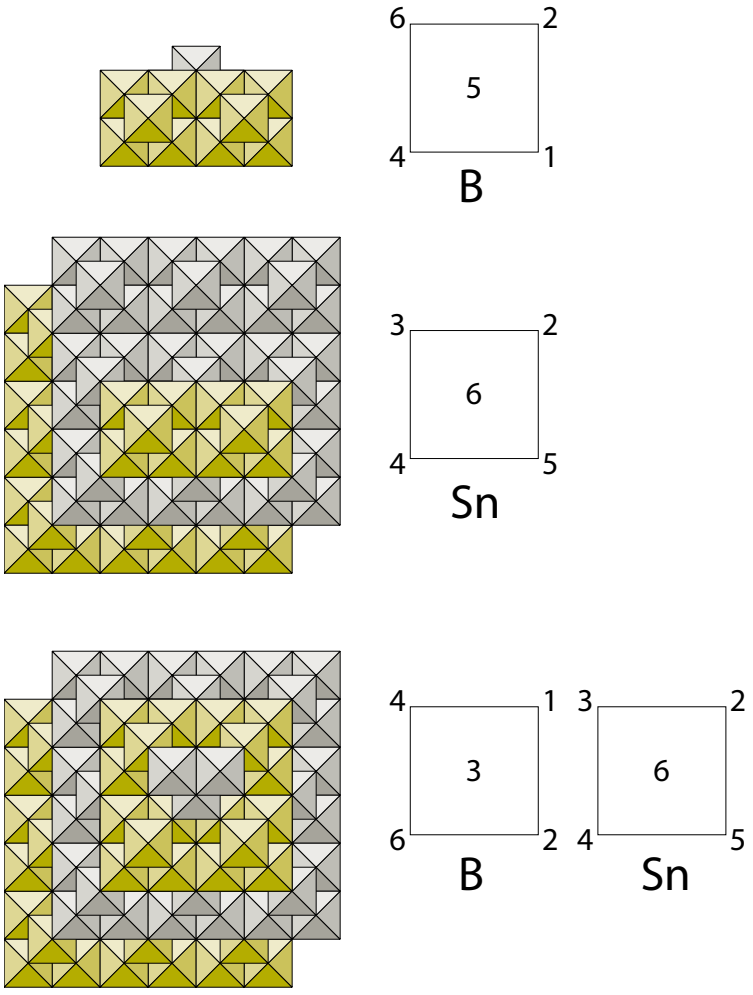

Fig. 126 BSn-group

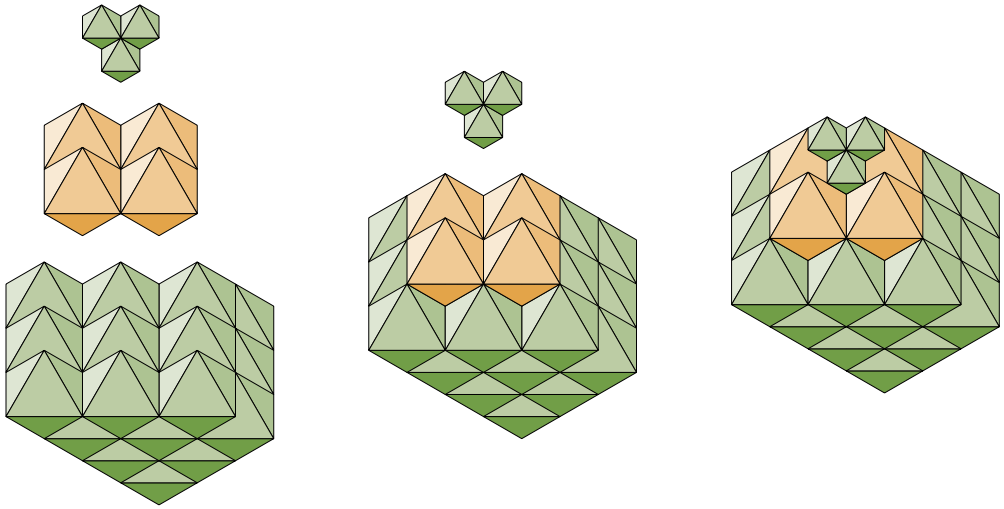

Fig. 127 BSn-group facial
The BSn-group is a Cs-atom homomorph.

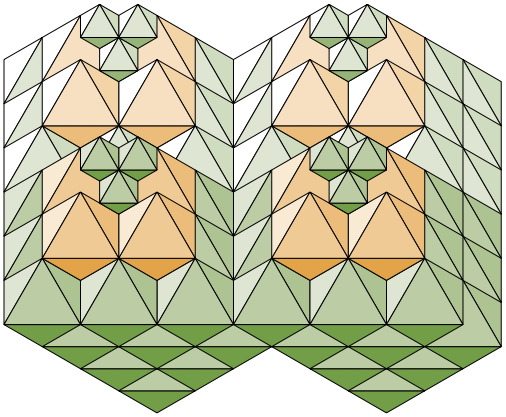

Fig. 128 BSn-crystal layer

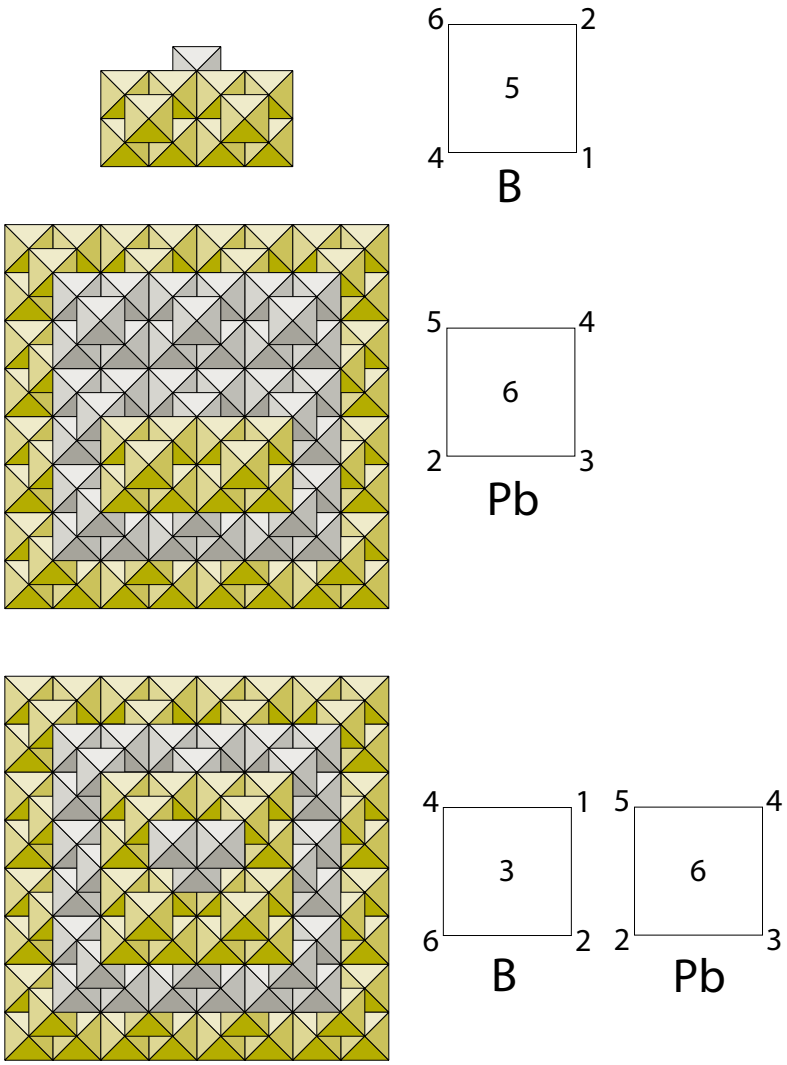

Fig. 129 BPb-group

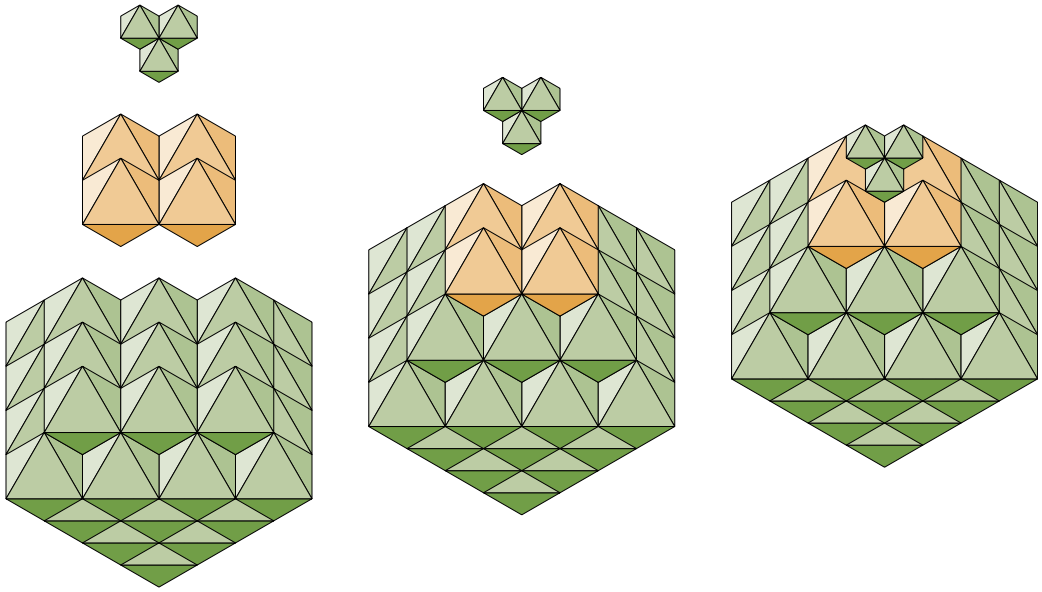

Fig. 130 BPb-group facial
The BPb-group is a Fr-atom homomorph.

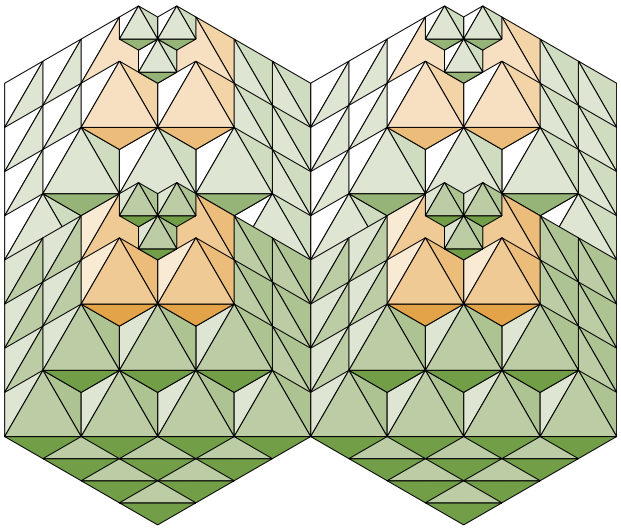

Fig. 131 BPb-crystal layer

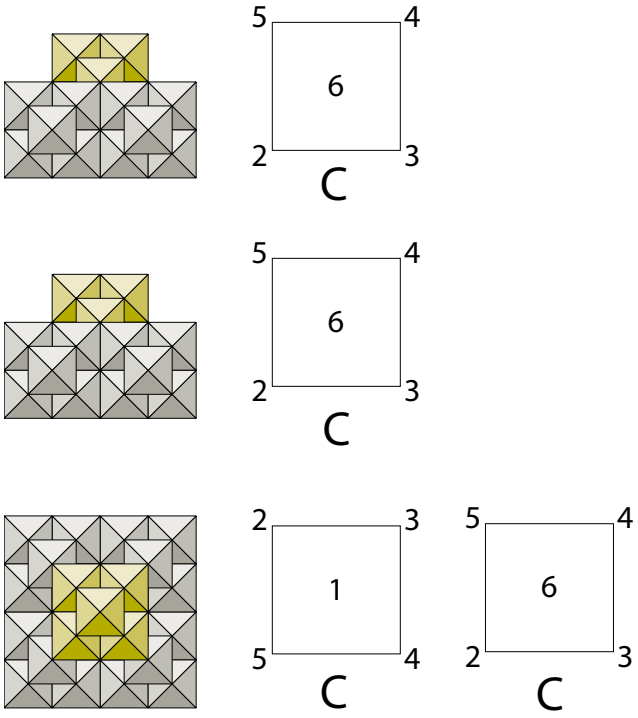

Fig. 132 CC-group

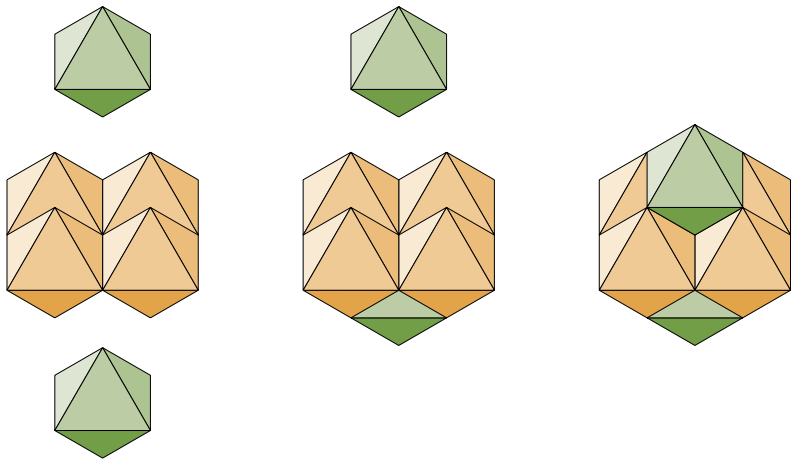

Fig. 133 CC-group facial
The CC-group is a Mg-atom homomorph.

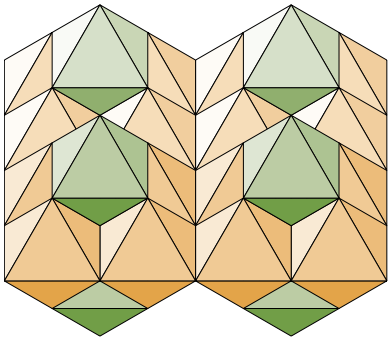

Fig. 134 CC-crystal layer

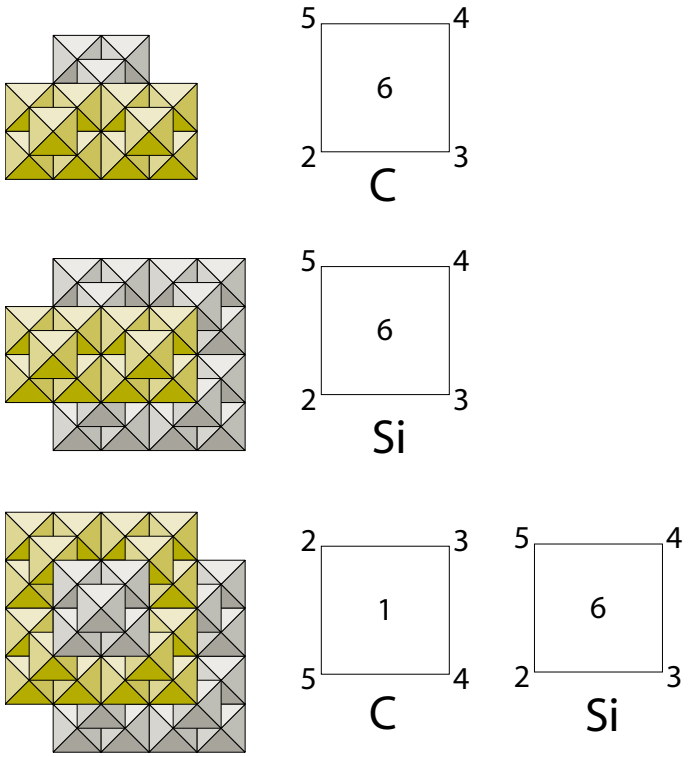

Fig. 135 CSi-group

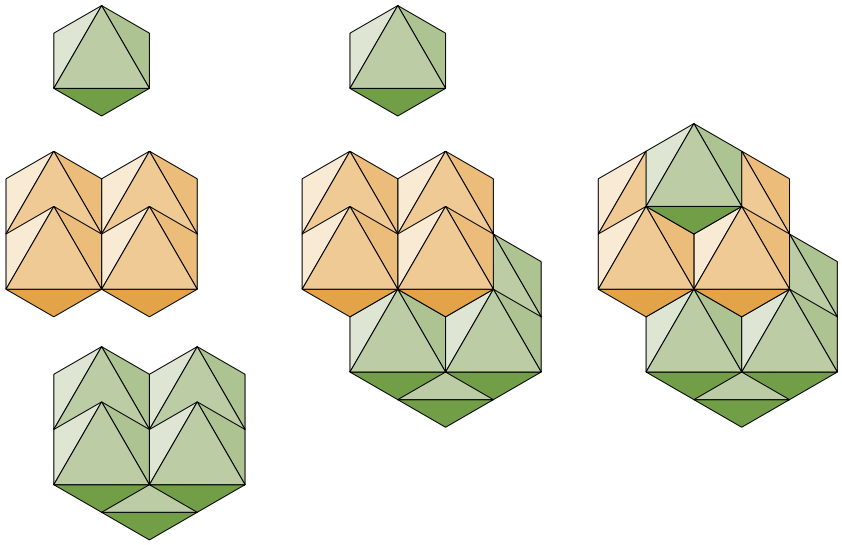

Fig. 136 CSi-group facial
The CSi-group is a Ca-atom homomorph.

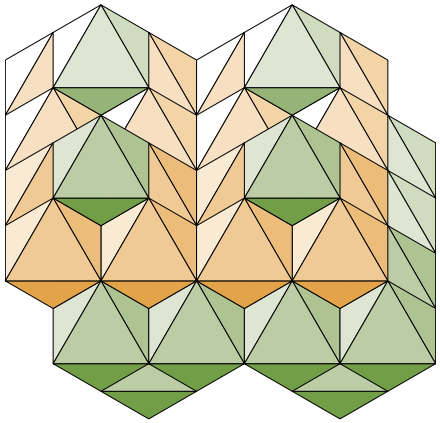

Fig. 137 CSi-crystal layer

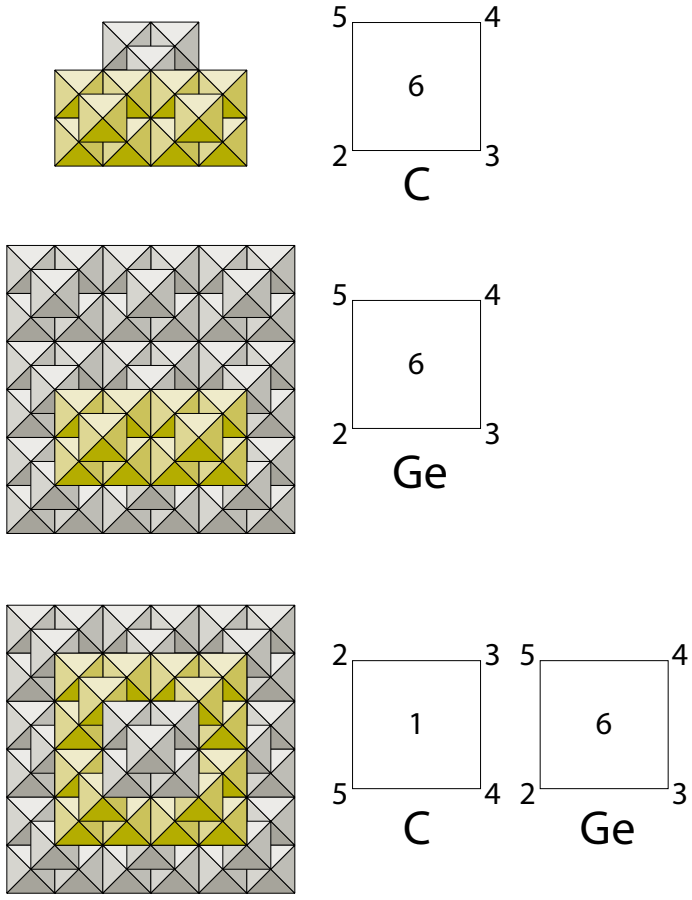

Fig. 138 CGe-group

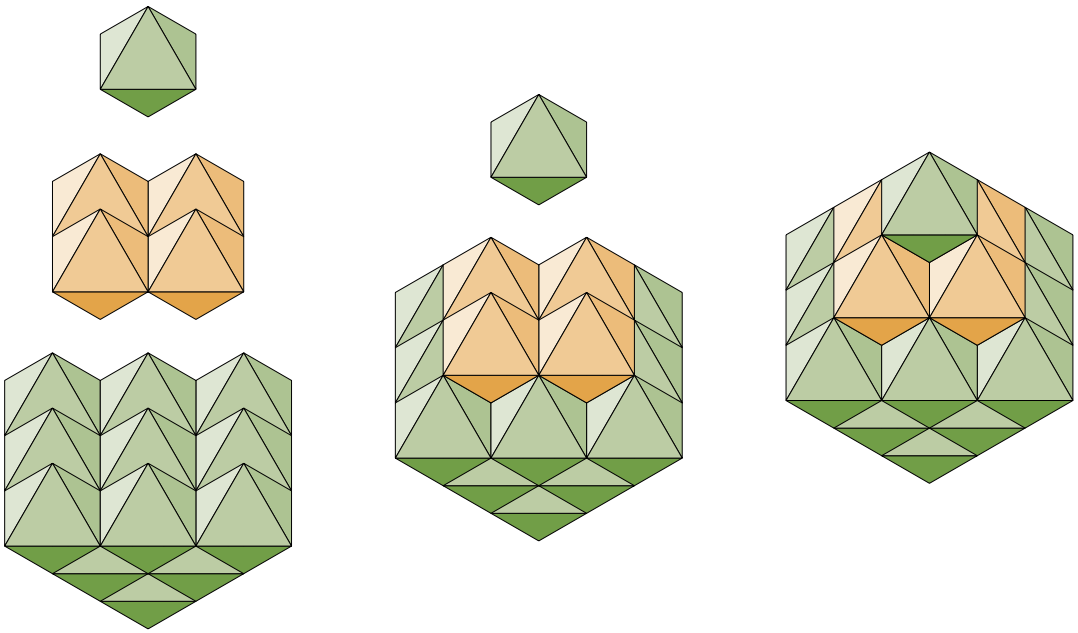

Fig. 139 CGe-group facial
The CGe-group is a Sr-atom homomorph.

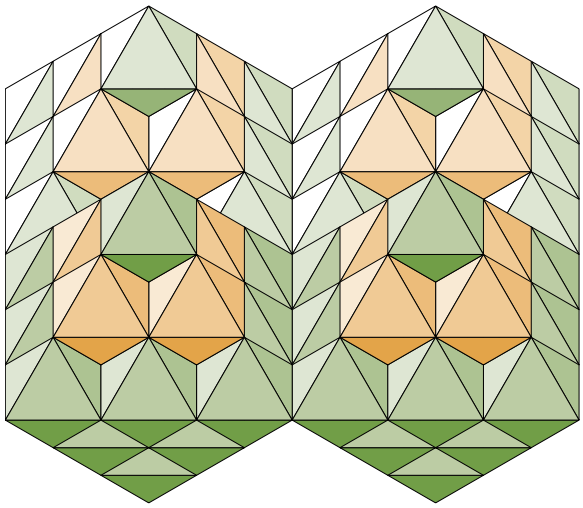

Fig. 140 CGe-crystal layer

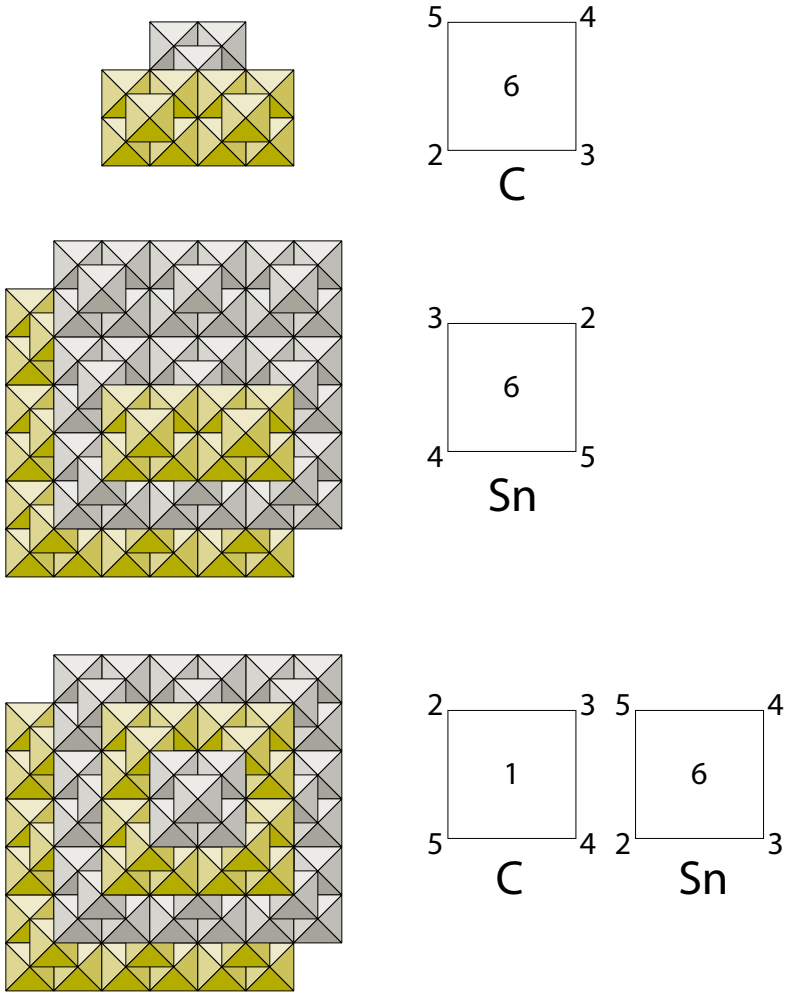

Fig. 141 CSn-group

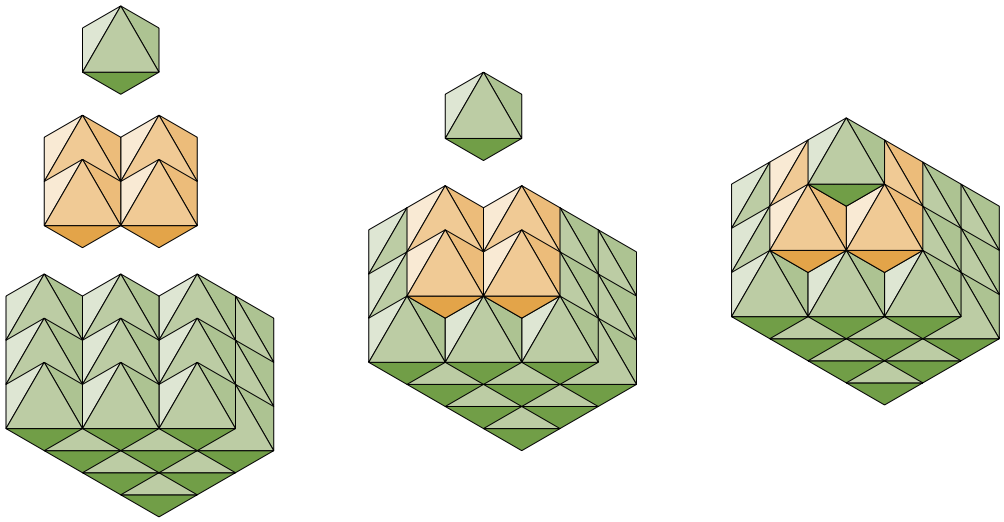

Fig. 142 CSn-group facial
The CSn-group is a Ba-atom homomorph.

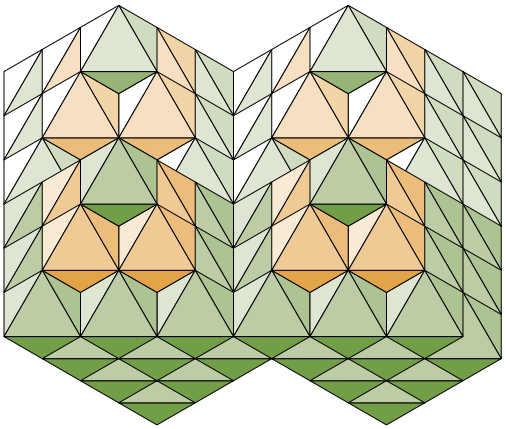

Fig. 143 CSn-crystal layer

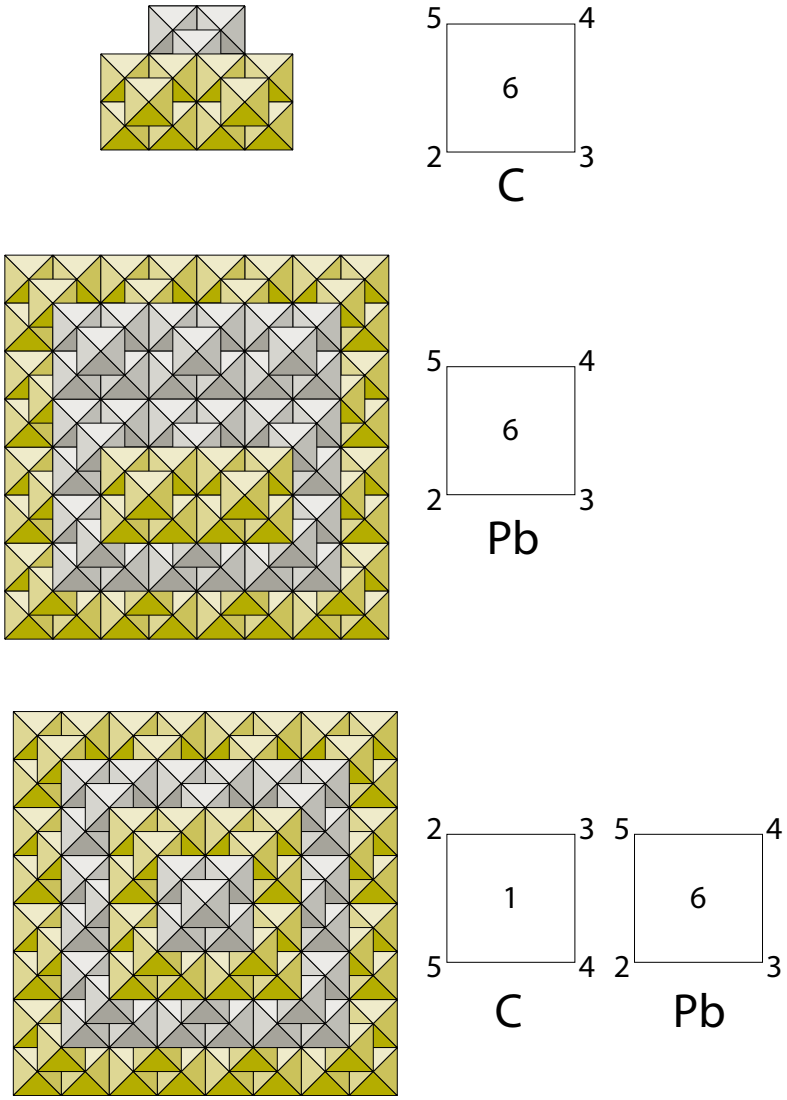

Fig. 144 CPb-group

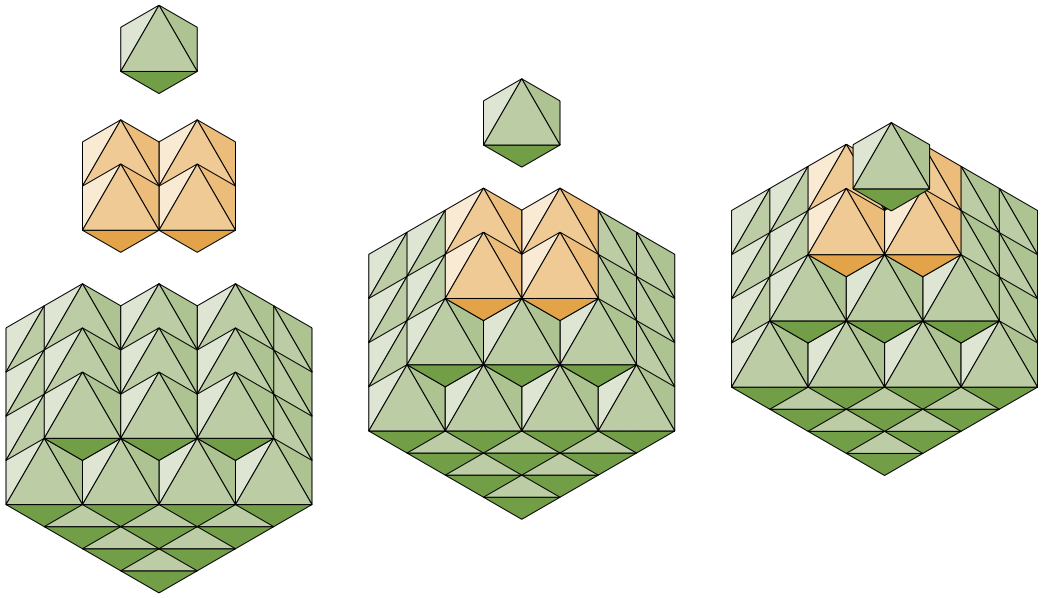

Fig. 145 CPb-group facial
The CPb-group is a Ra-atom homomorph.

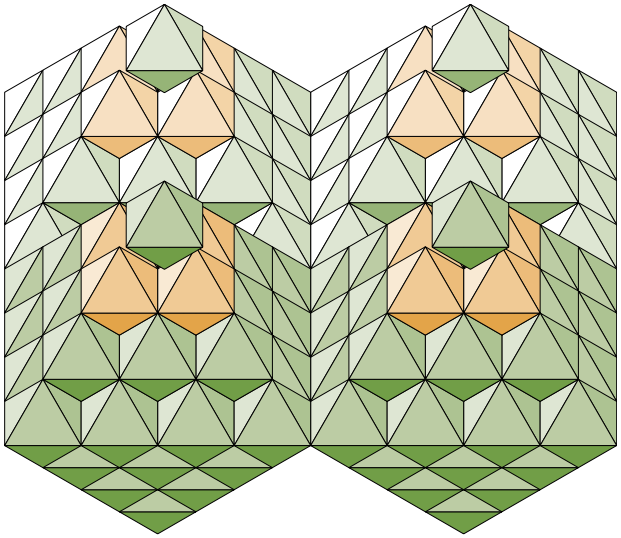

Fig. 146 CPb-crystal layer

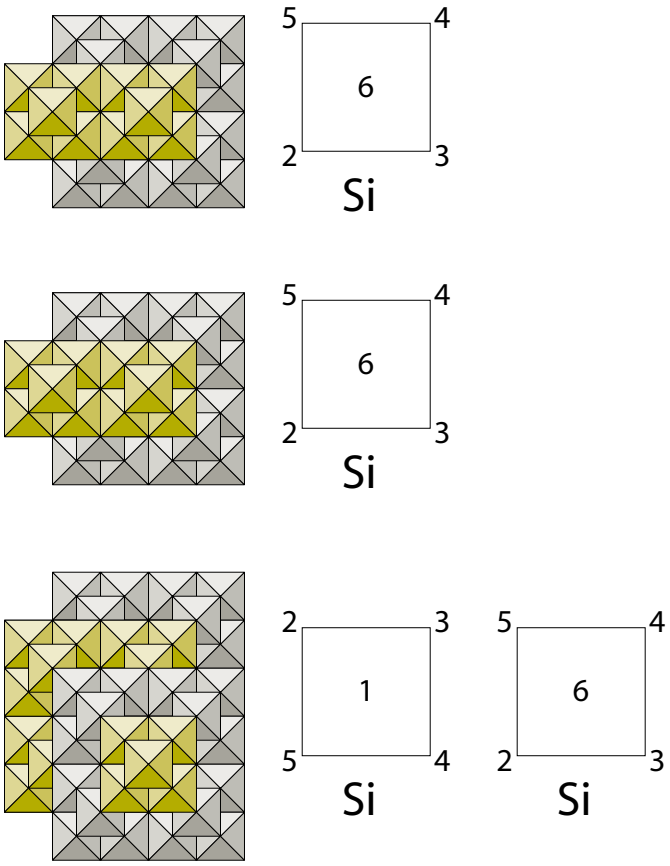

Fig. 147 SiSi-group Type I

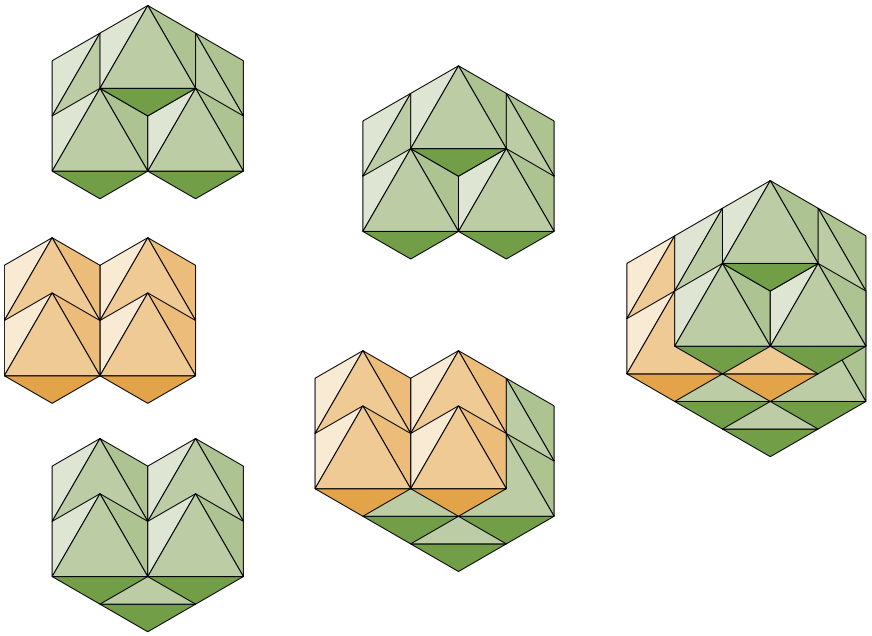

Fig. 148 SiSi-group Type I facial

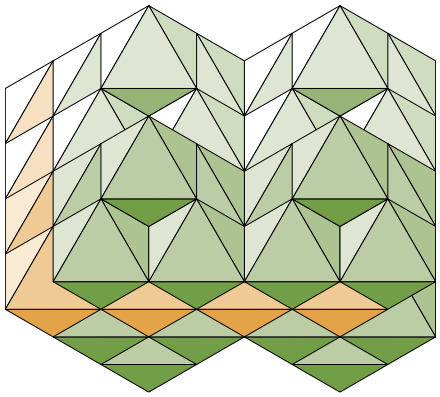

Fig. 149 SiSi-crystal Type 1 layer

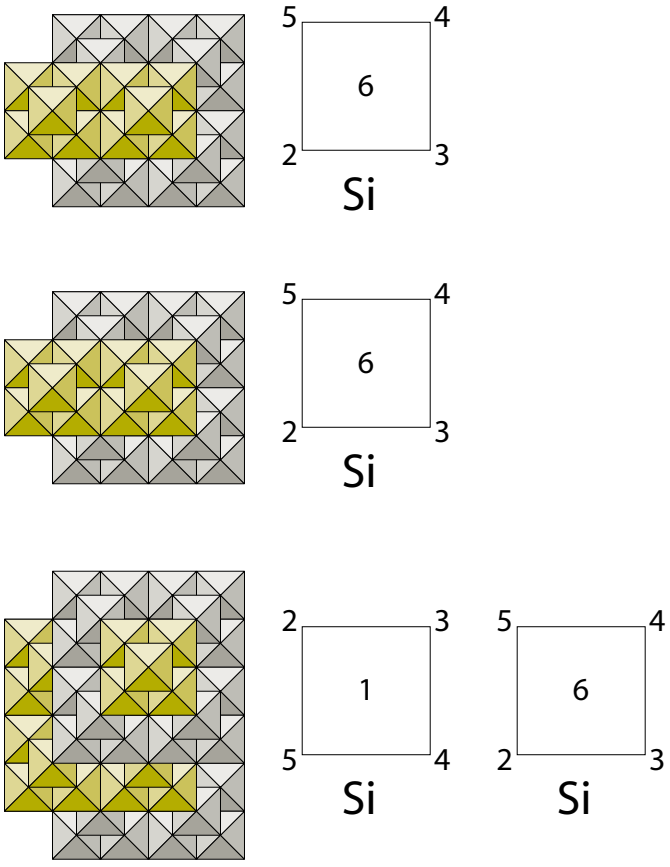

Fig. 150 SiSi-group Type II

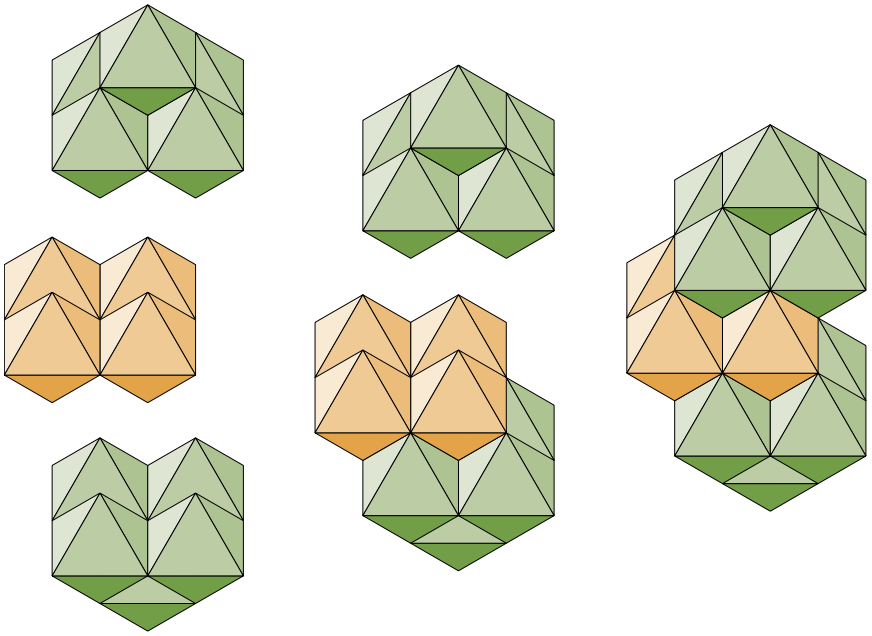

Fig. 151 SiSi-group Type II facial

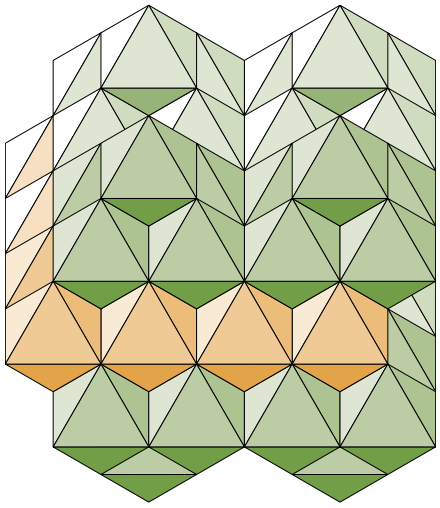

Fig. 152 SiSi Type II crystal

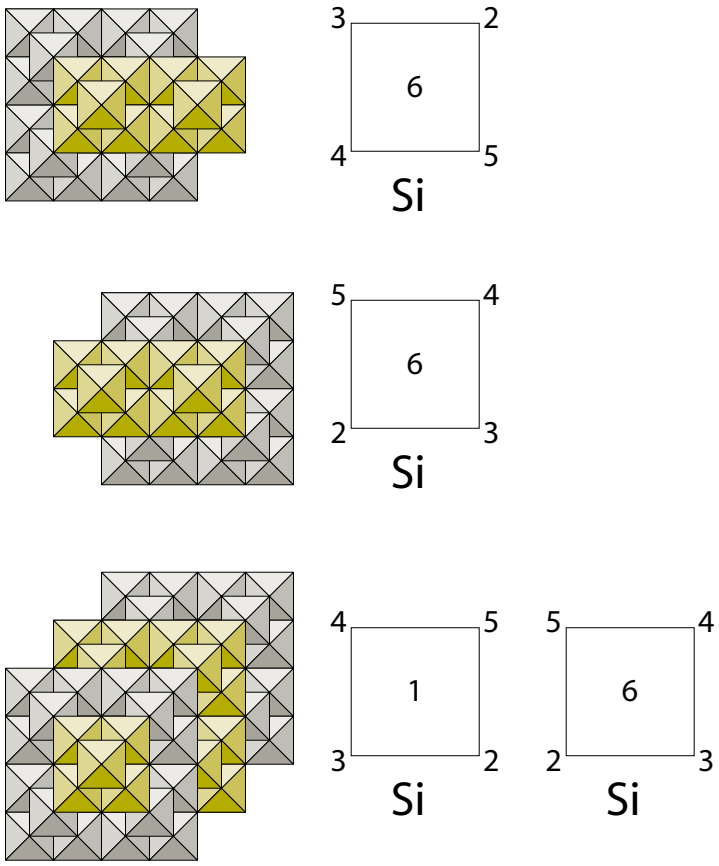

Fig. 153 SiSi-group Type III

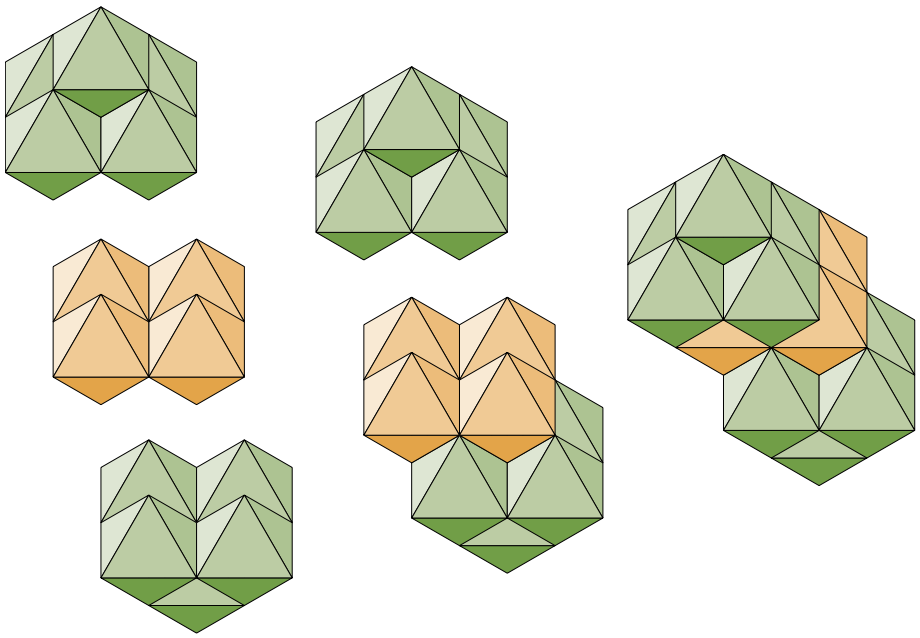

Fig. 154 SiSi-group Type III facial

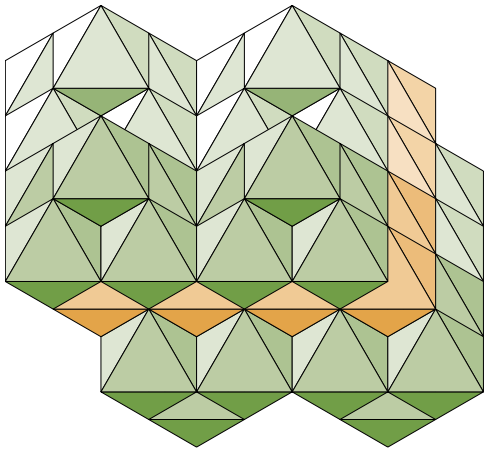

Fig. 155 SiSi-crystal Type III layer

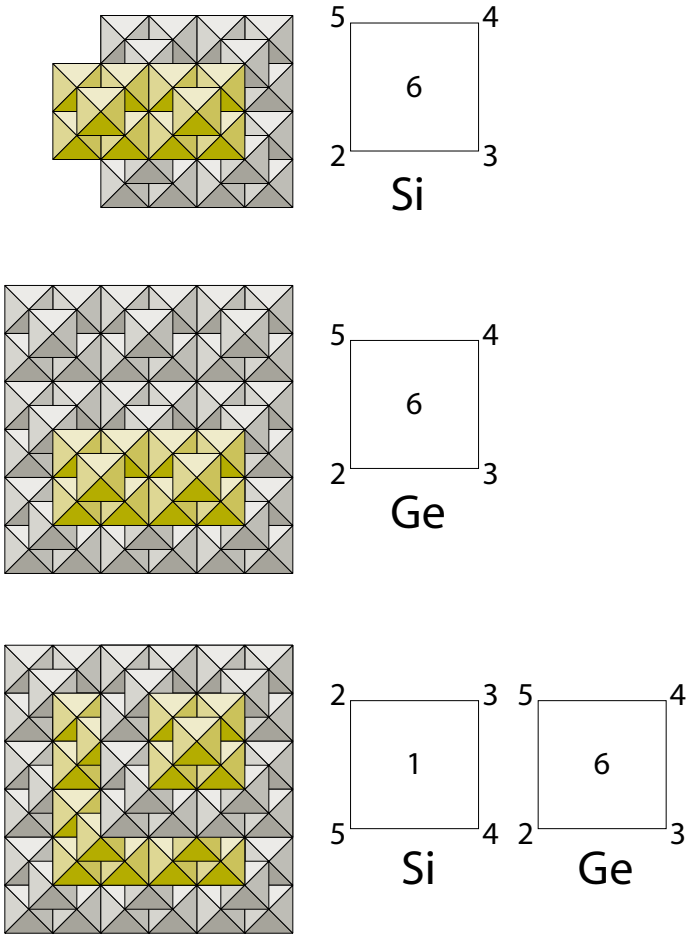

Fig. 156 SiGe-group

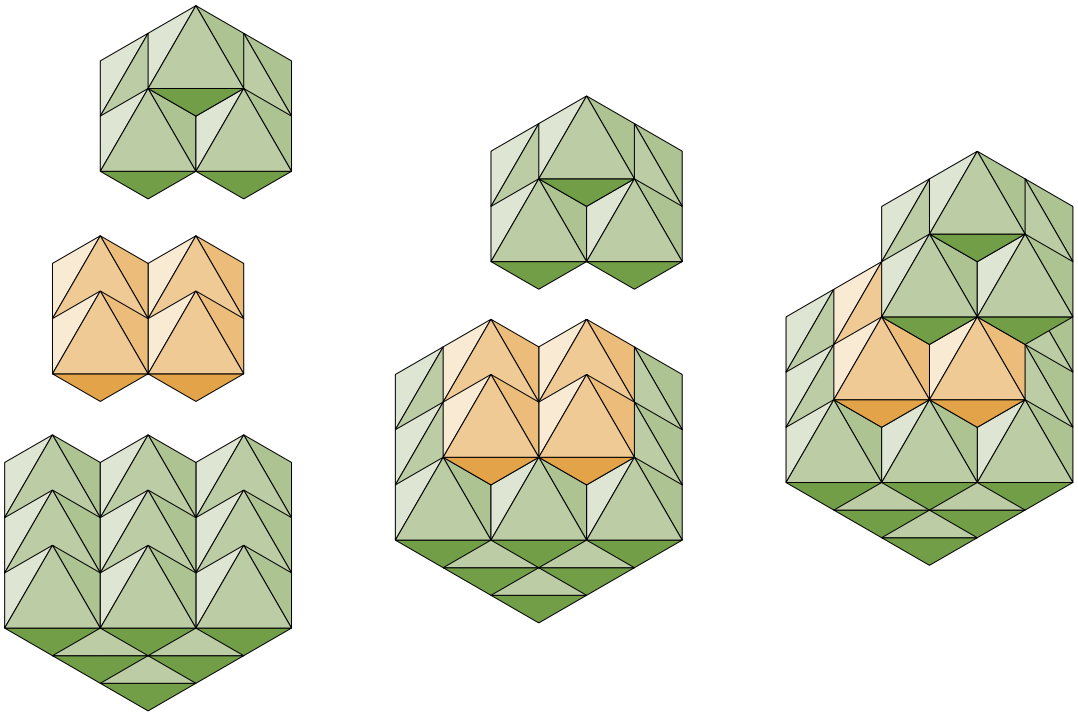

Fig. 157 SiGe-group facial

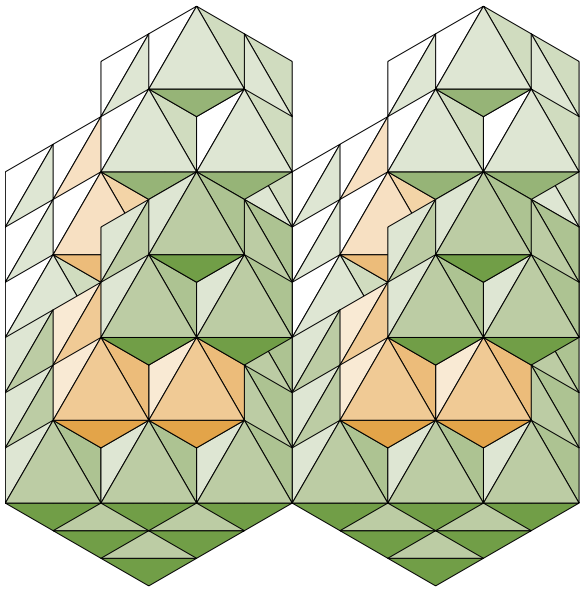

Fig. 158 SiGe-crystal layer

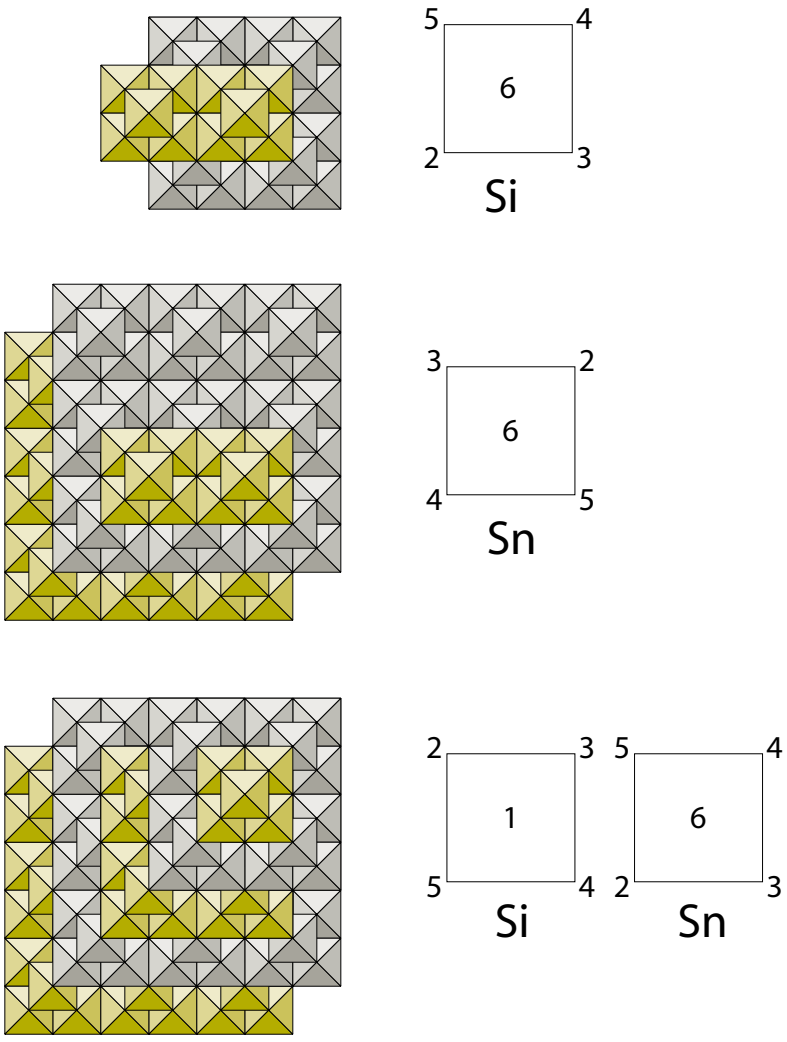

Fig. 159 SiSn-group

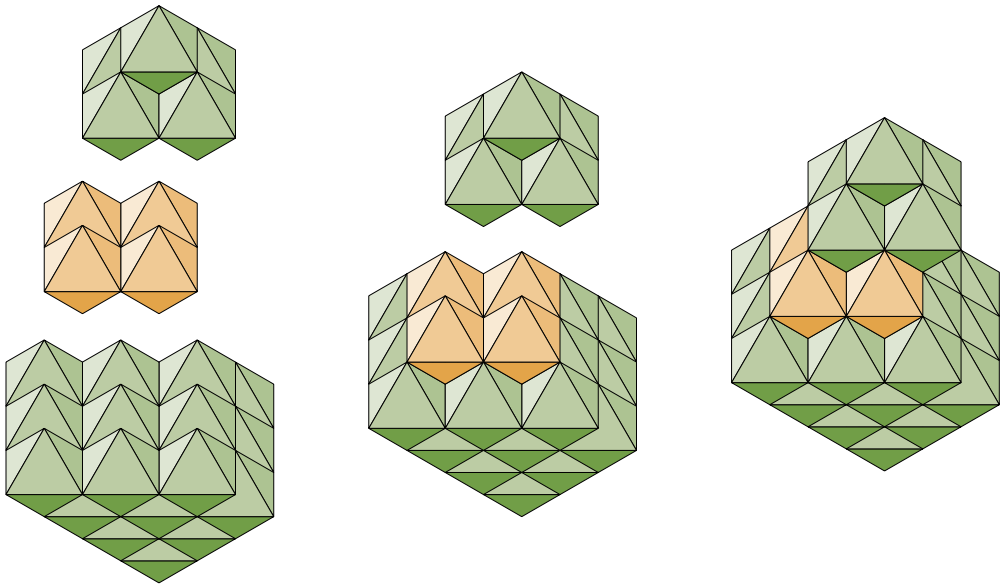

Fig. 160 SiSn-group facial

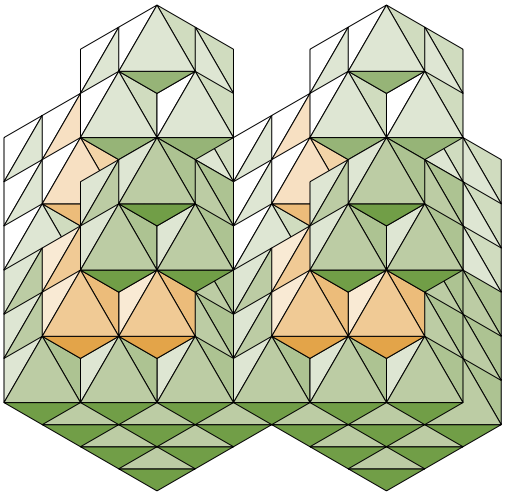

Fig. 161 SiSn-crystal layer

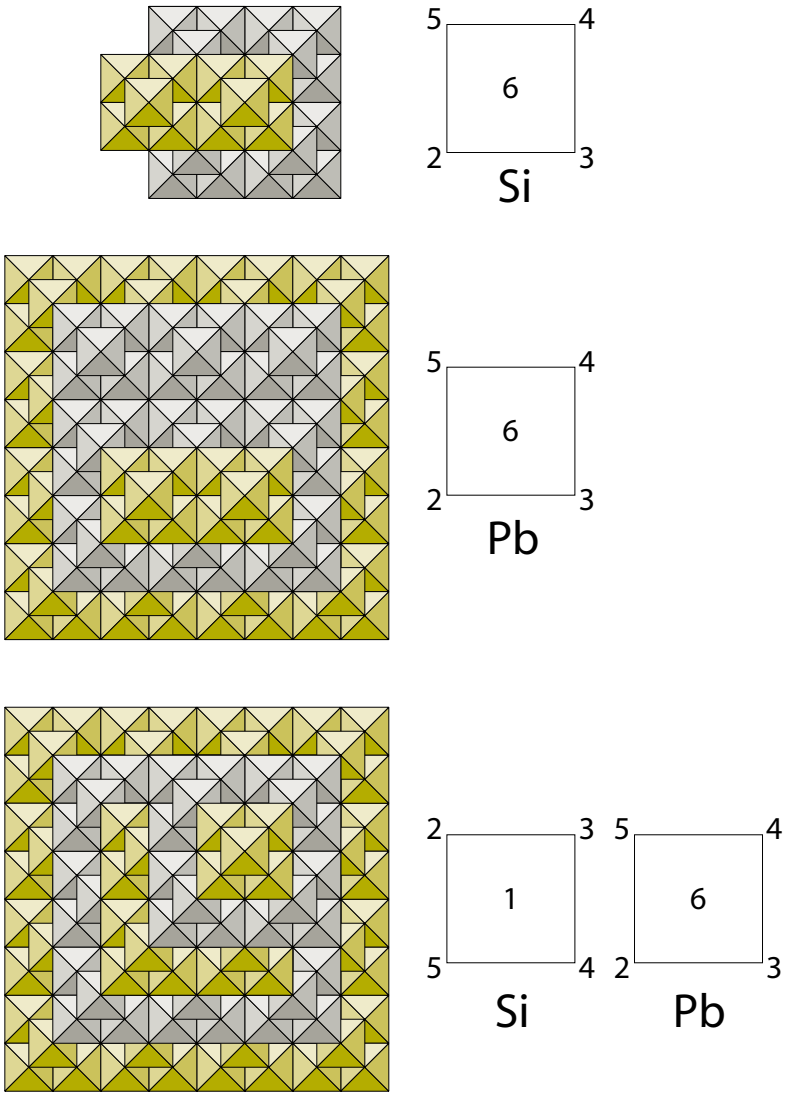

Fig. 162 SiPb-group

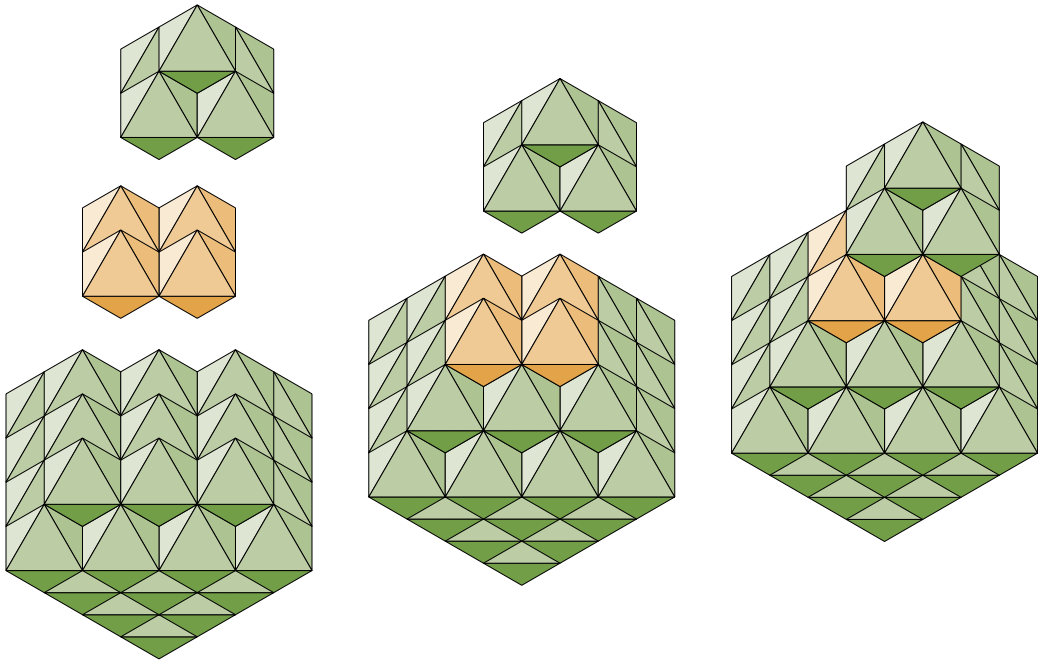

Fig. 163 SiPb-group facial

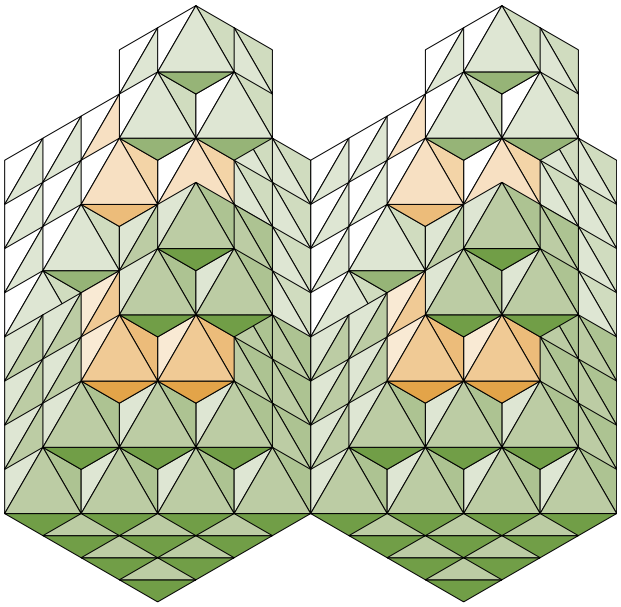

Fig. 164 SiPb-crystal

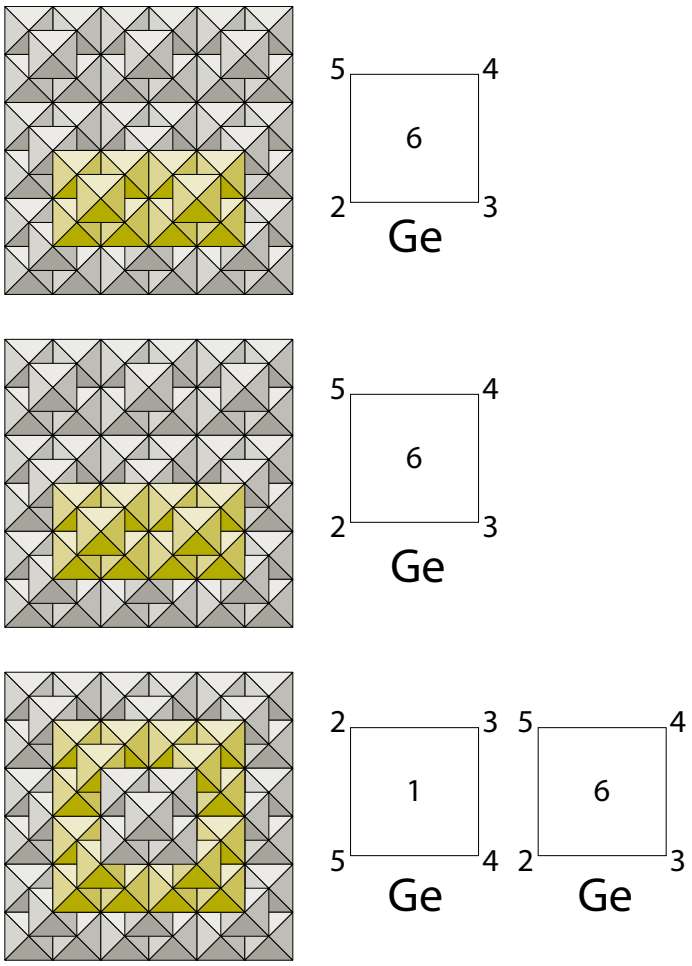

Fig. 165 GeGe-group

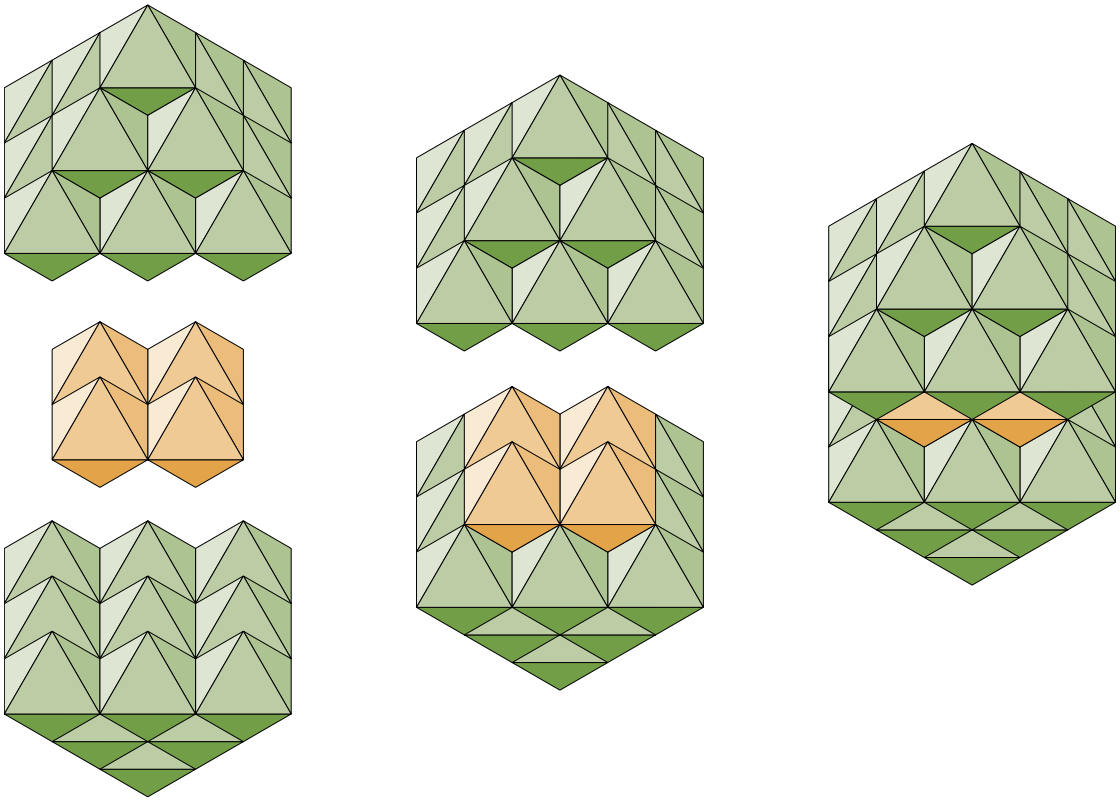

Fig. 166 GeGe-group facial

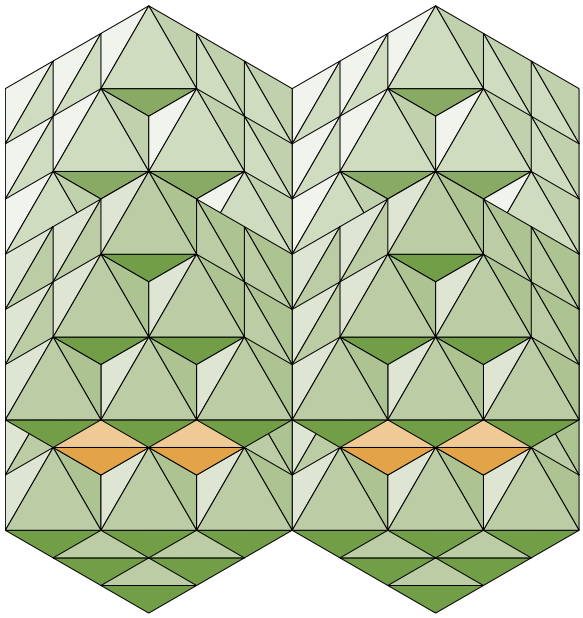

Fig. 167 GeGe crystal plane

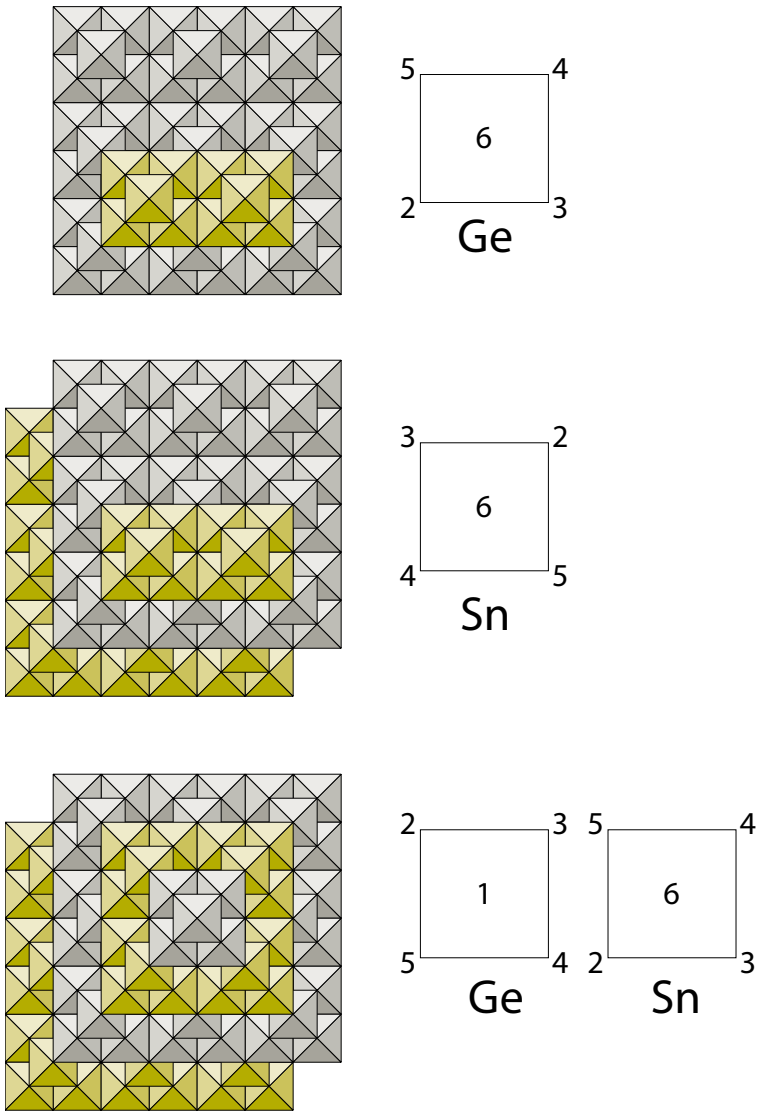

Fig. 168 GeSn-group

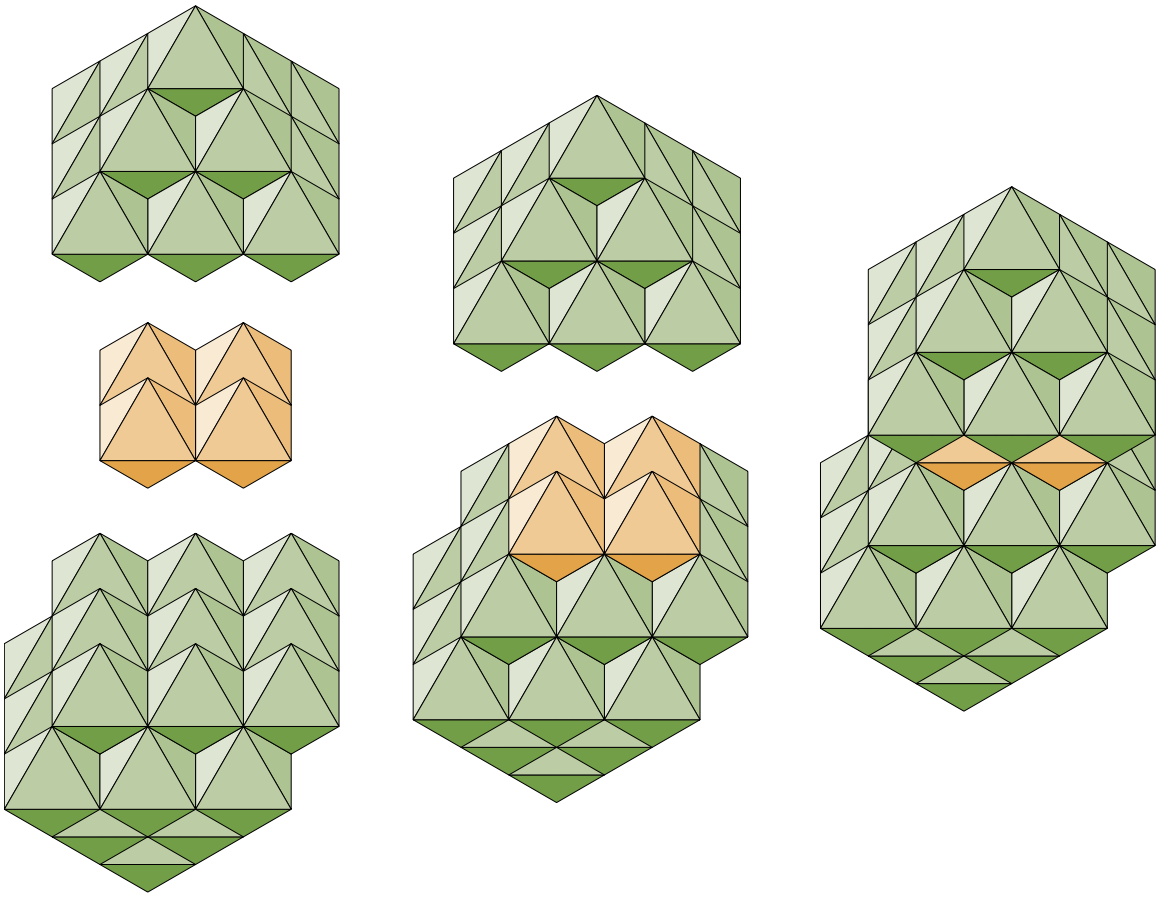

Fig. 169 GeSn-group facial

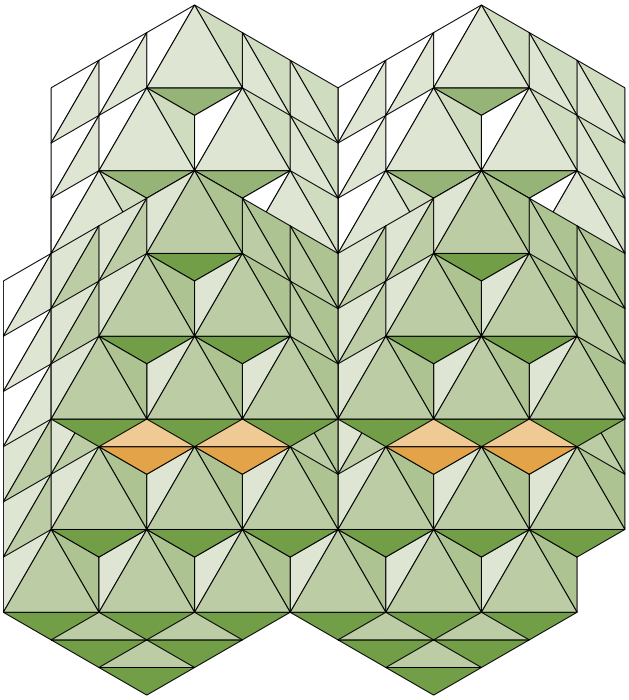

Fig. 170 GeSn-crystal layer

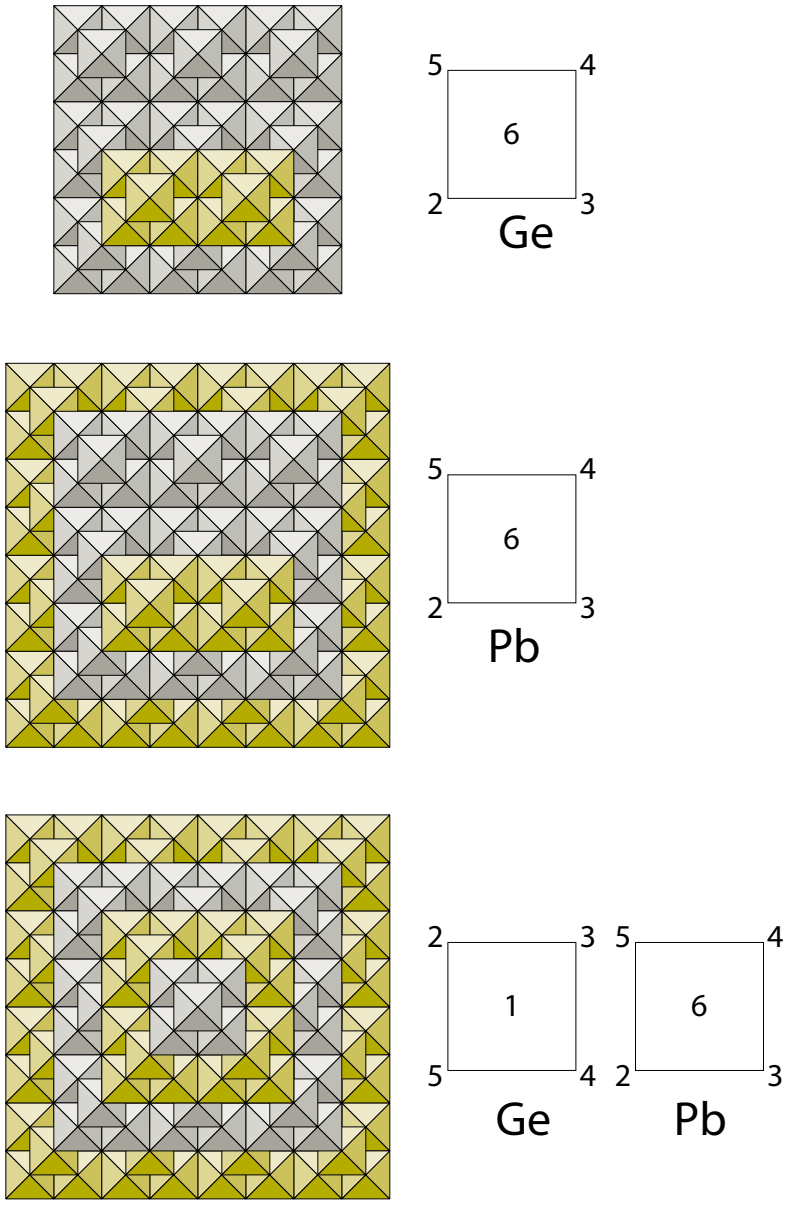

Fig. 171 GePb-group

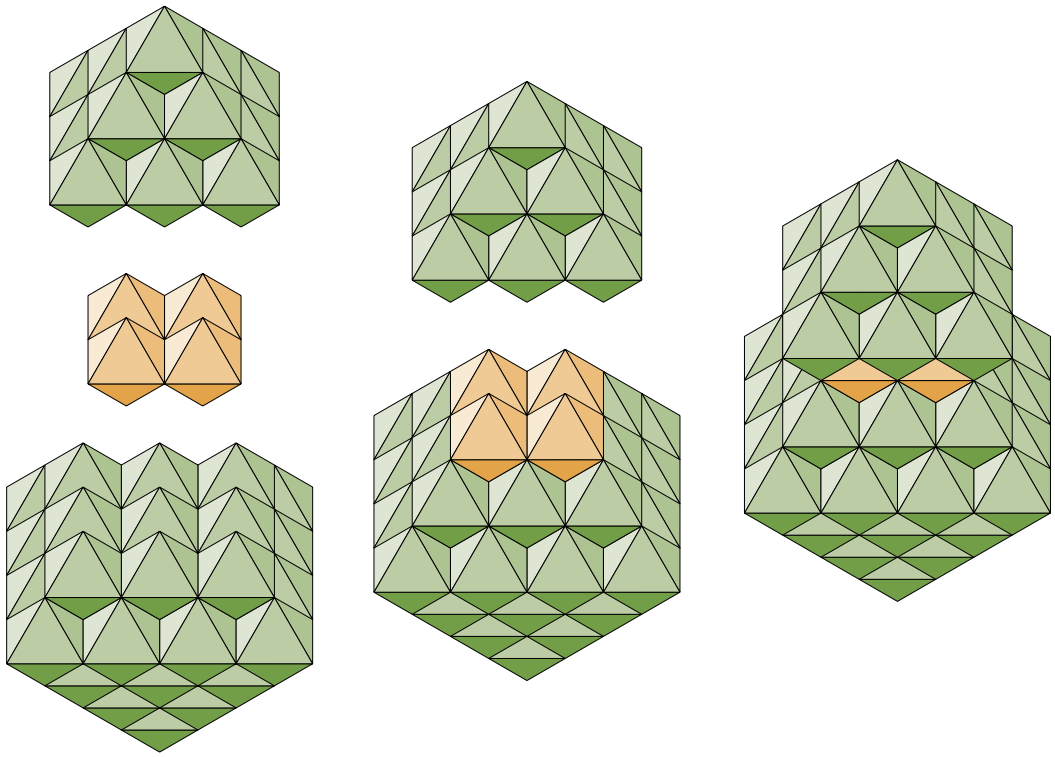

Fig. 172 GePb-group facial

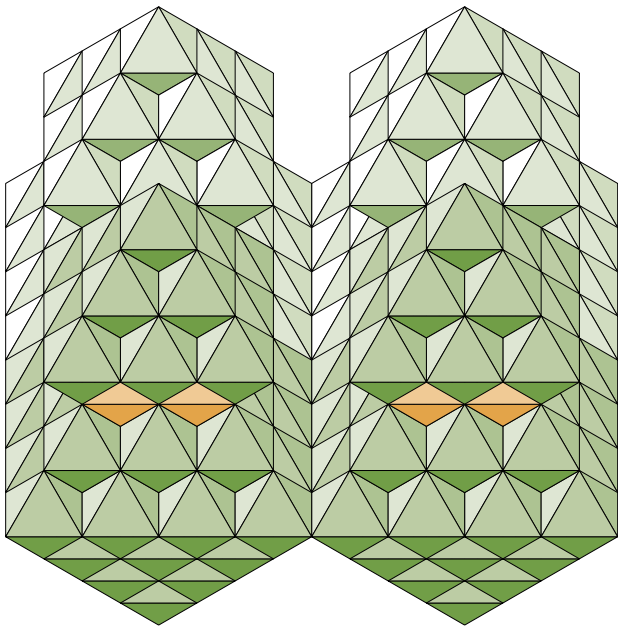

Fig. 173 GePb-crystal layer

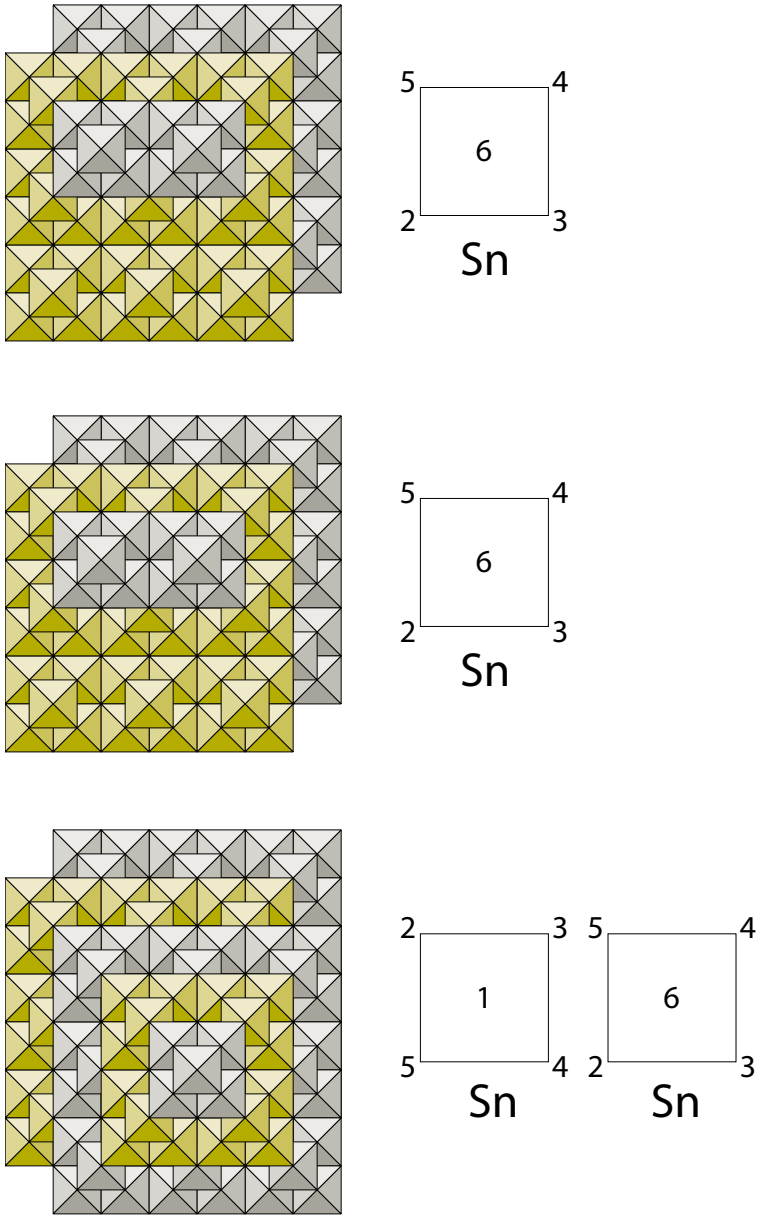

Fig. 174 SnSn-group

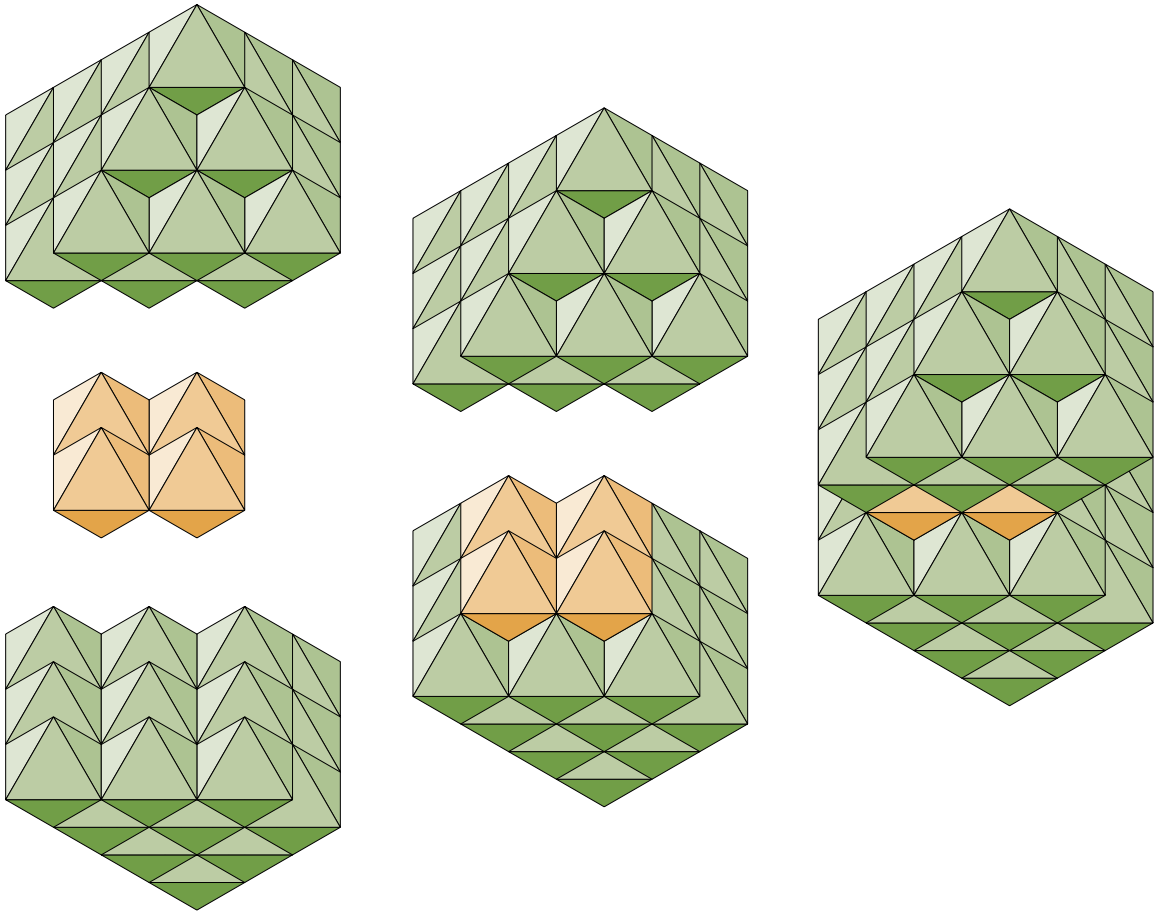

Fig. 175 SnSn-group facial

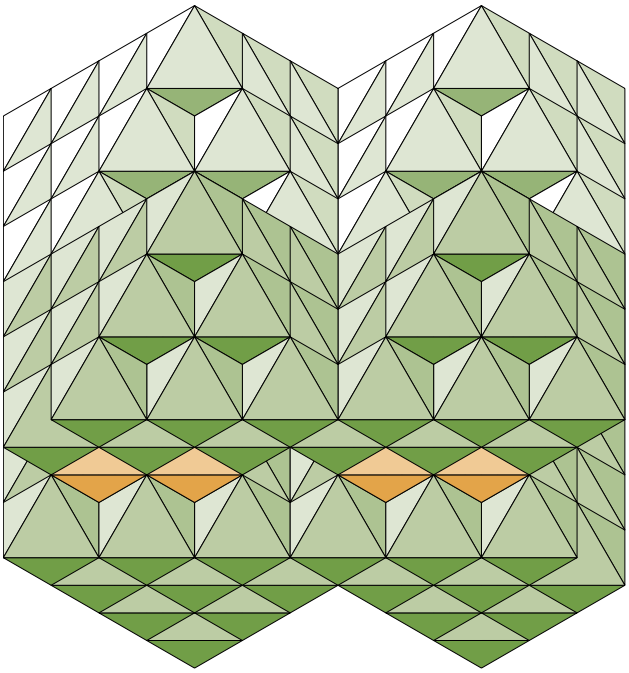

Fig. 176 SnSn-crystal layer

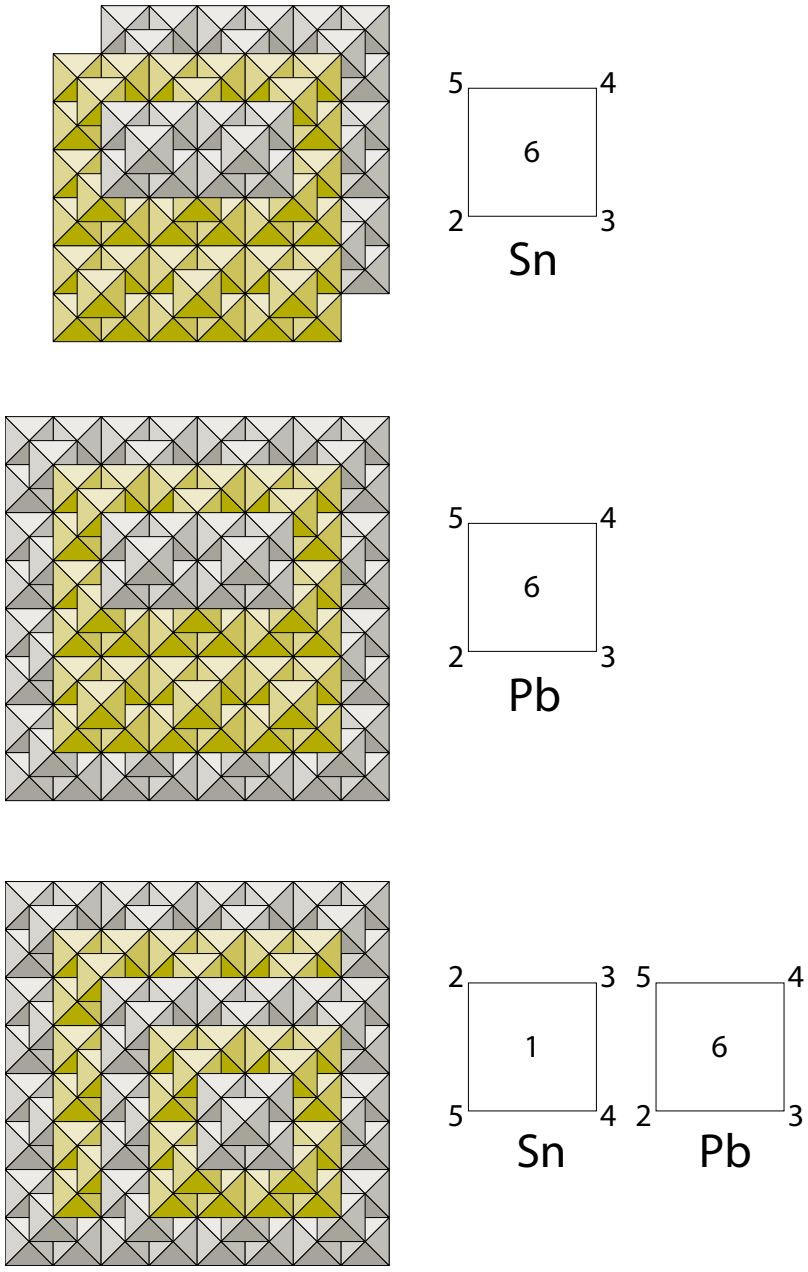

Fig. 177 SnPb-group

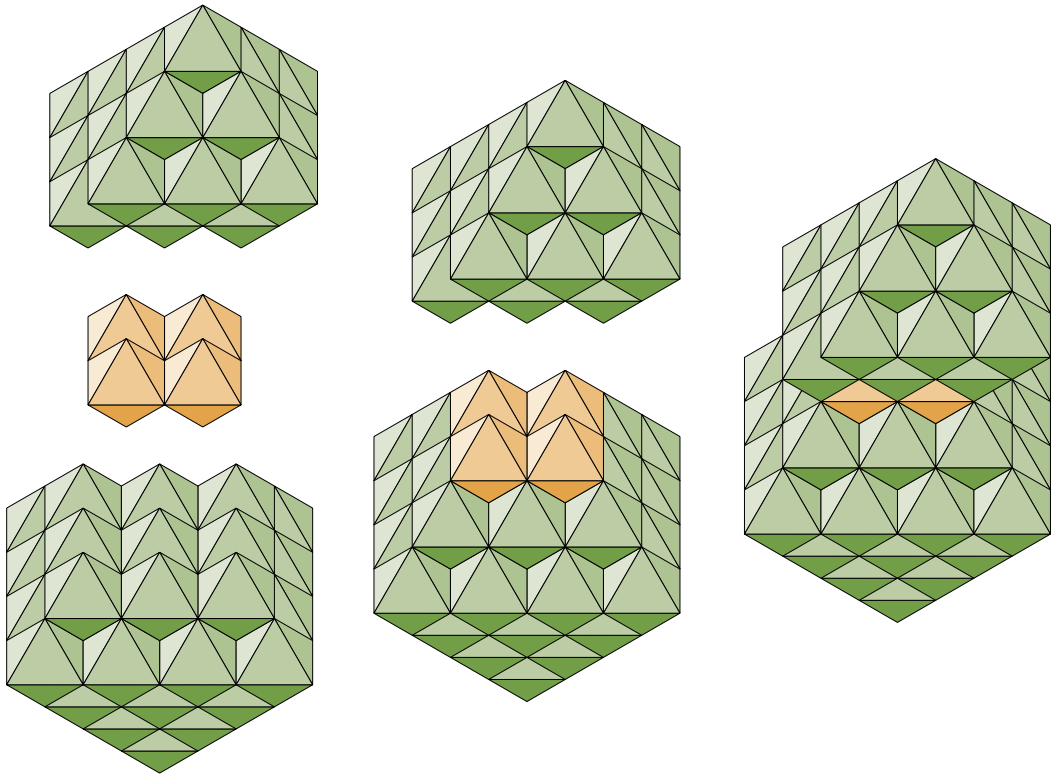

Fig. 178 SnPb-group facial

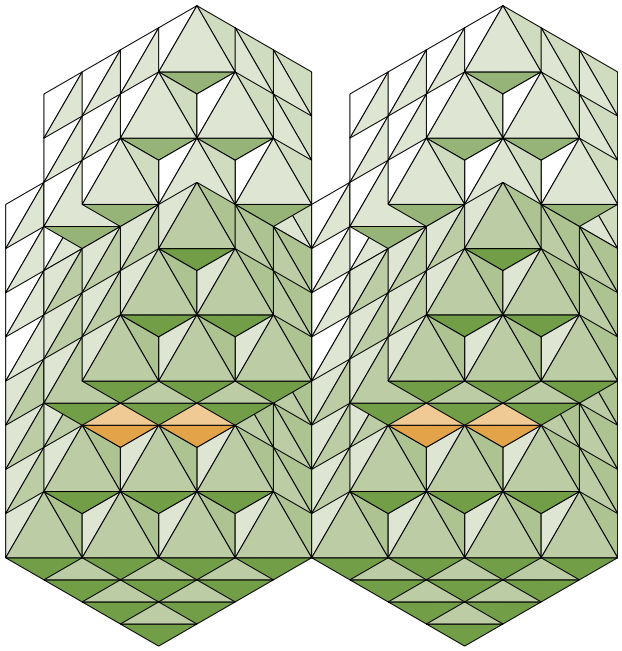

Fig. 179 SnPb-crystal layer

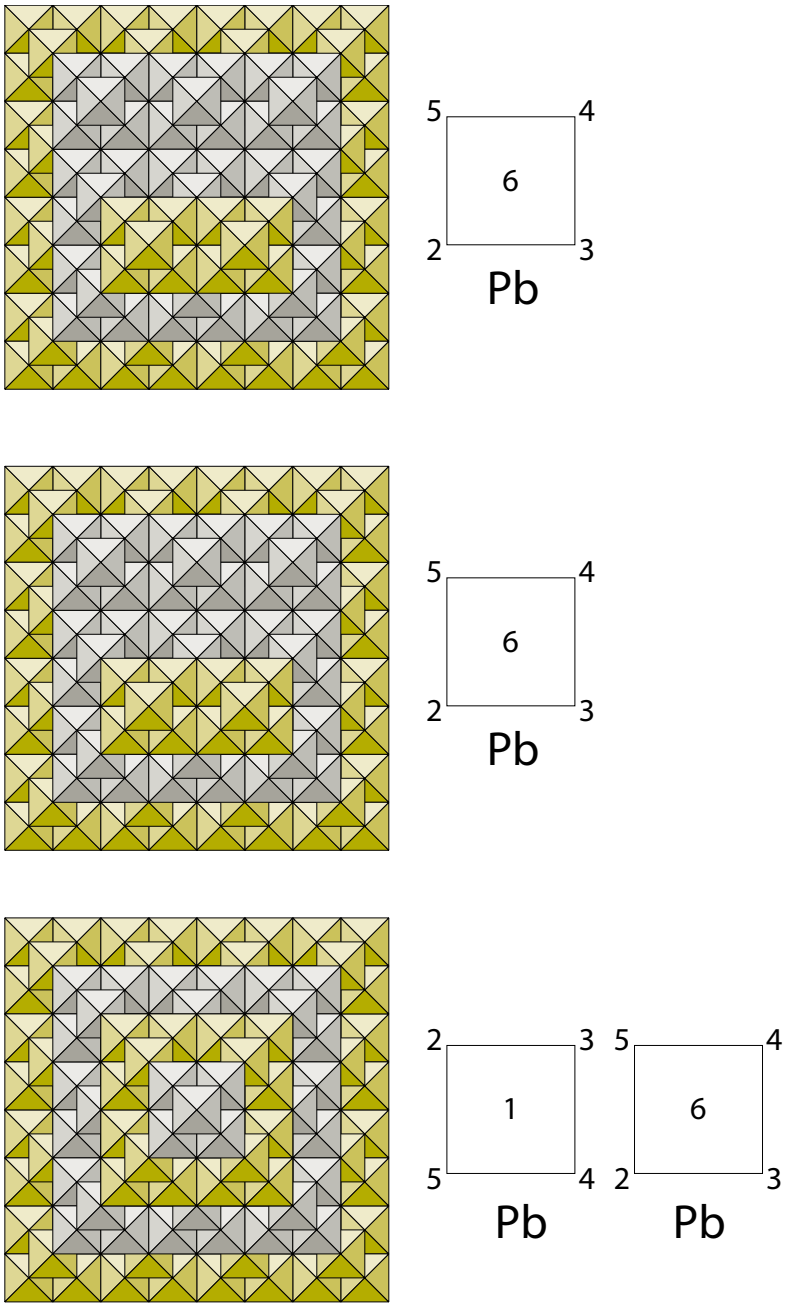

Fig. 180 PbPb-group

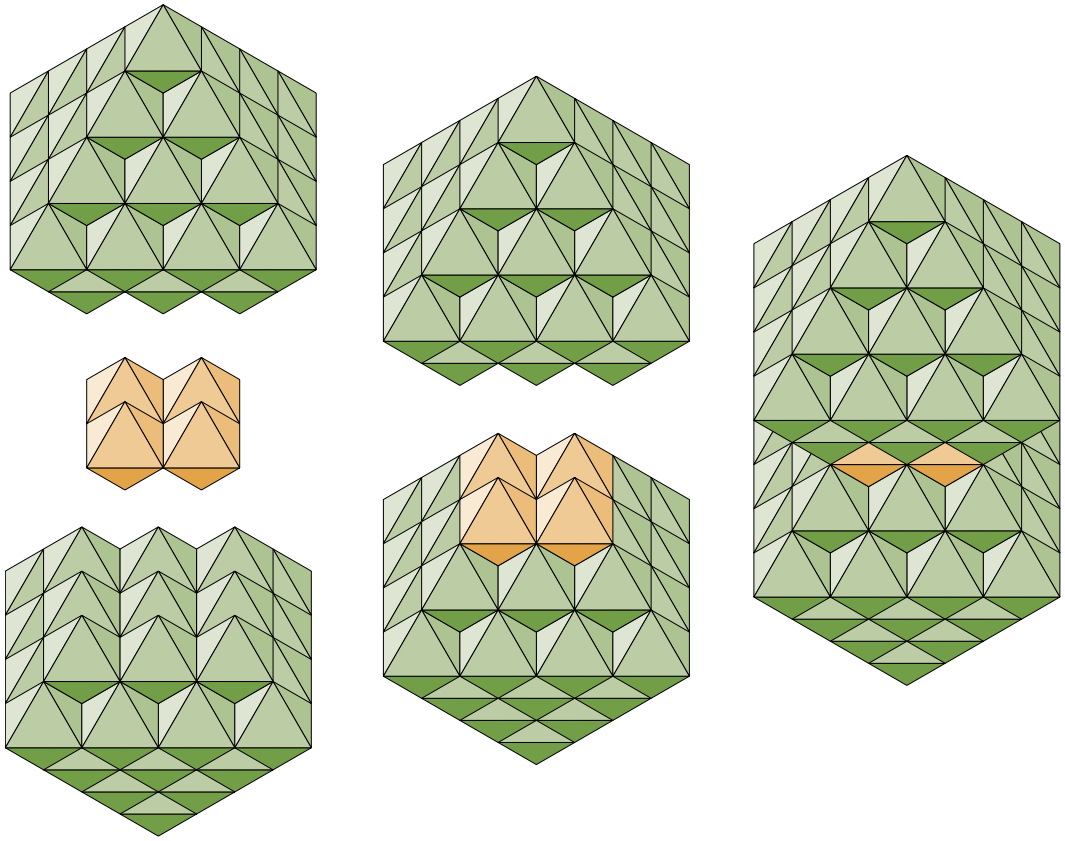

Fig. 181 PbPb-group facial

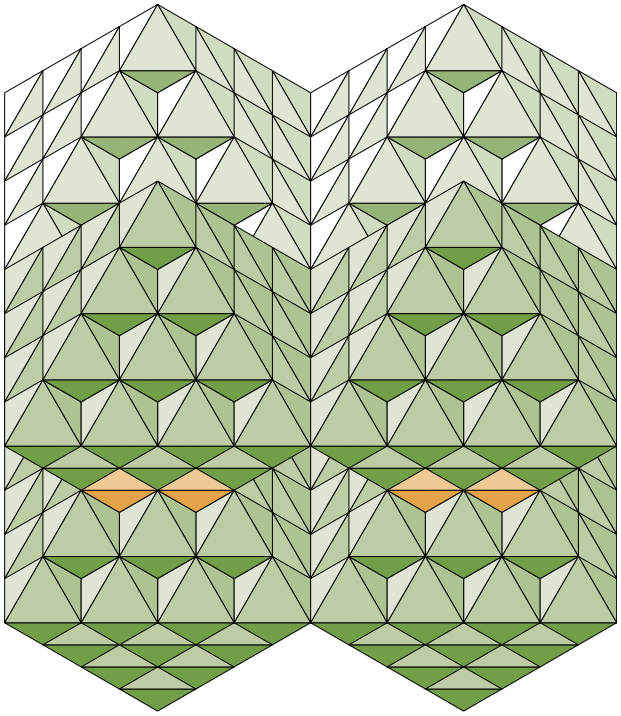

Fig. 182 PbPb-crystal layer