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Lord, Mackay, Ranganathan
[Plate Section]

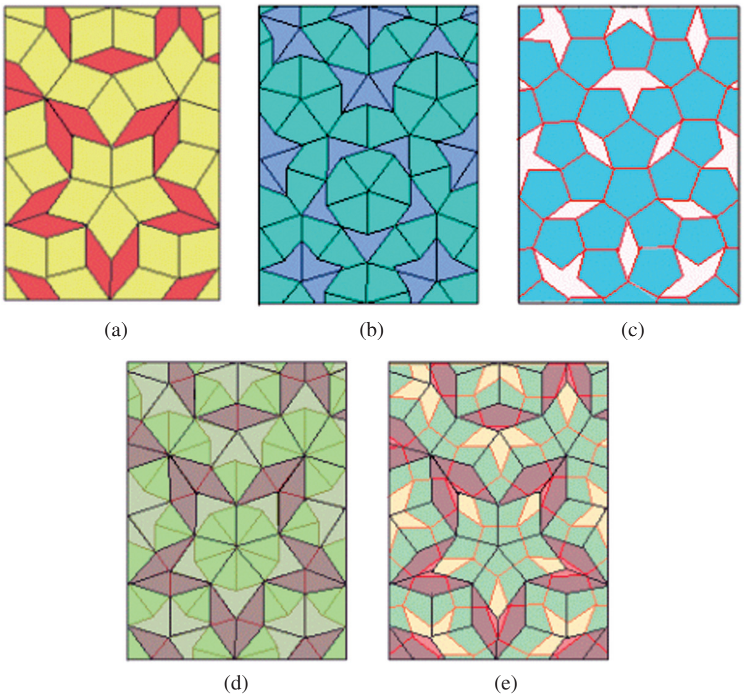

Plate I Penrose tiling patterns. (a) Rhomb pattern; (b) kite and dart; (c) pentagon pattern. (d) Superimposition of (a) and (b) – observe that all the 'fat rhombs' are decorated identically by the kite and dart pattern, as are all the thin rhombs. (e) The superposition of (a) and (c), demonstrating the equivalence of the rhomb and the pentagon patterns.

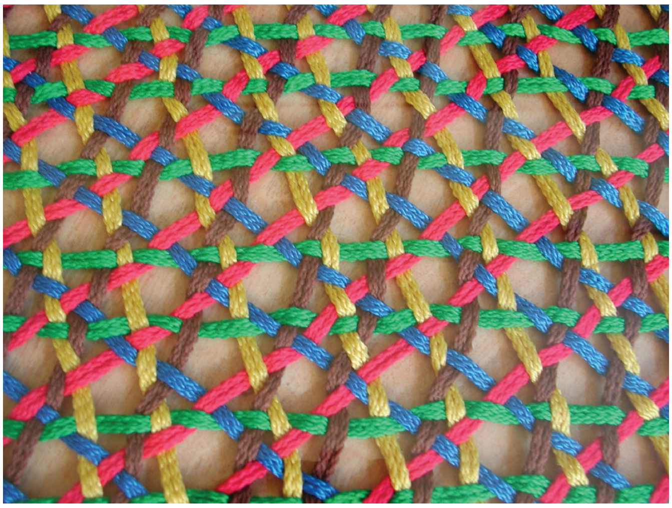

Plate II Five-stranded weaving pattern based on the Penrose rhomb tiling. Detail from a coffee table designed and made by Robert Mackay.

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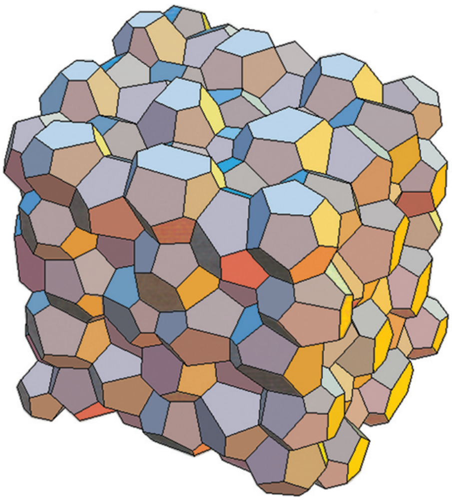

Plate III The Voronoi regions around the 152 atoms in a unit cell of $Mg_{32}(Al, Zn)_{49}$.

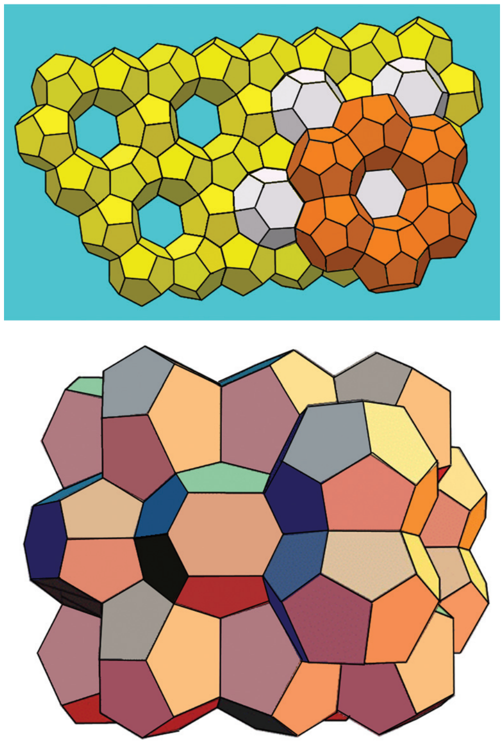

Plate IV Two views of the dissection of space into Voronoi regions of Zr_4Al_3.

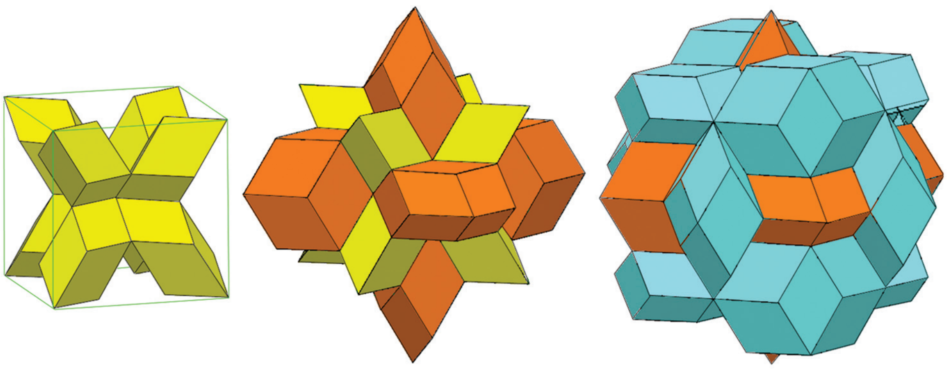

Plate V A periodic packing of prolate Kowalewski units and rhombic dodecahedra; (a) the cubic unit cell contains eight prolate units; (b) the rhombic dodecahedra are centered at mid-ponts of faces of the unit cell and (c) at mid points of the edges of the unit cell.

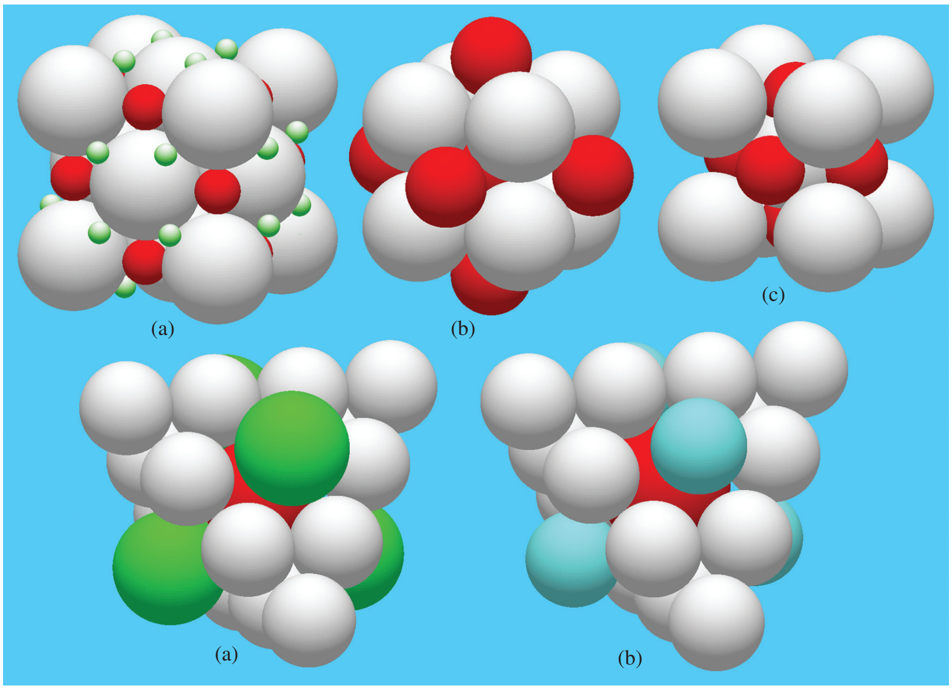

Plate VI Top row: (a) the fcc sphere packing with smaller spheres in the octahedral interstices (red) and in the tetrahedral interstices (green); (b) spheres occupying the voids in a primitive cubic array of close packed spheres; (c) a bcc array of spheres with smaller spheres occupying the voids. Bottom row: (a) a portion of the Laves type packing of spheres of three kinds, with optimised packing fraction. (b) The modified AB_5 Laves phase in which half the large atoms are replaced by the small atoms.

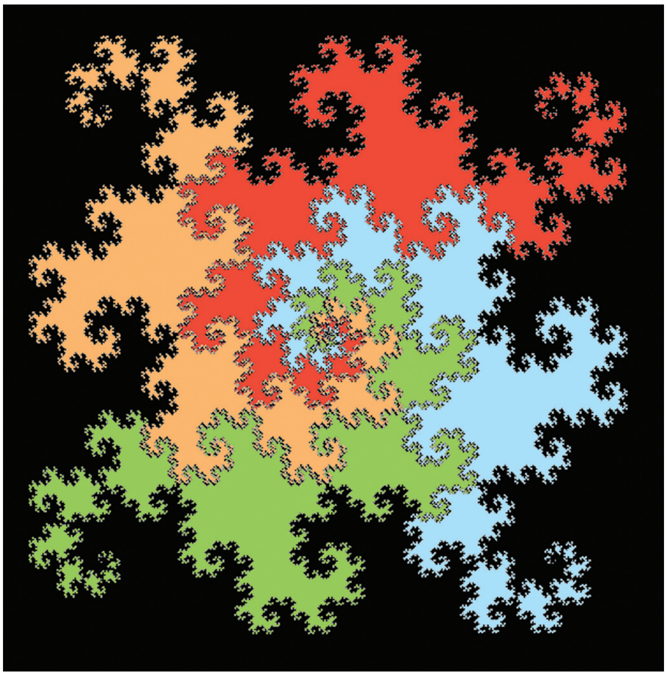

Plate VII A tile produced from four dragon curves.

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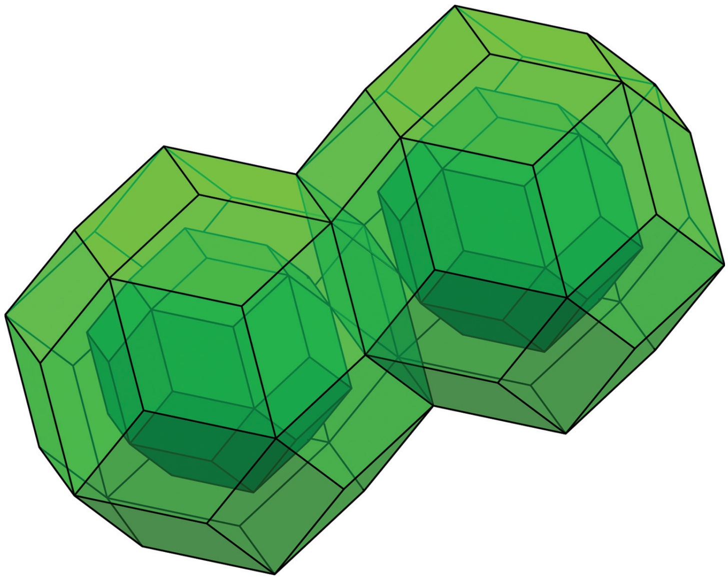

Plate VIII Two of the triacontahedral clusters of the R-phase, showing the 'twinning' along a threefold axis. Note how the inner and outer triacontahedra have common vertices.

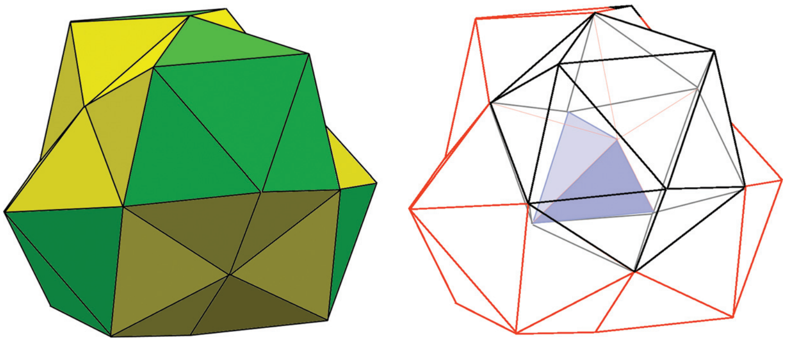

Plate IX The 26-atom γ-brass cluster as a cluster of four interpenetrating icosahedra.

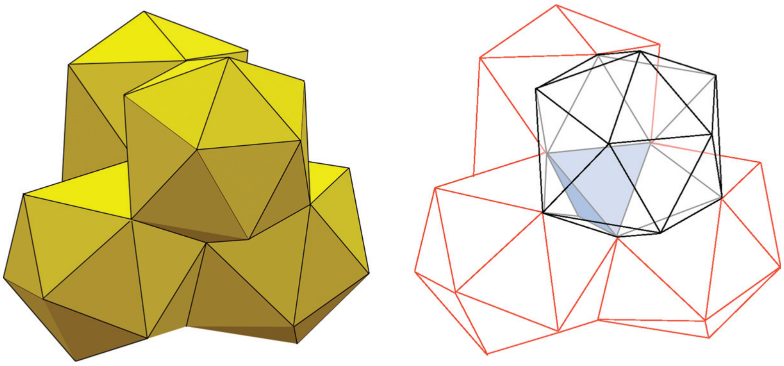

Plate X The Pearce cluster. Four icosahedra on the faces of a tetrahedron.

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[Plate Section]

Plate XI A model of a portion of the infinite 'regular' polyhedron {3, 7}.

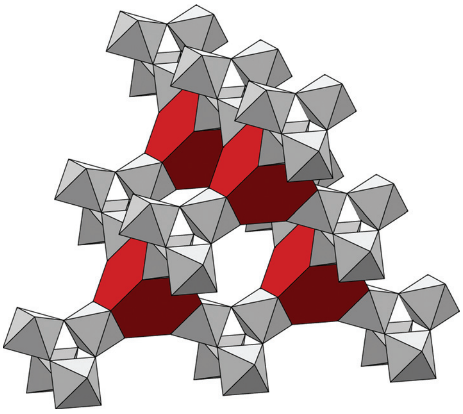

Plate XII A D-net in which nodes are alternately pyrochlore units and truncated tetrahedra.

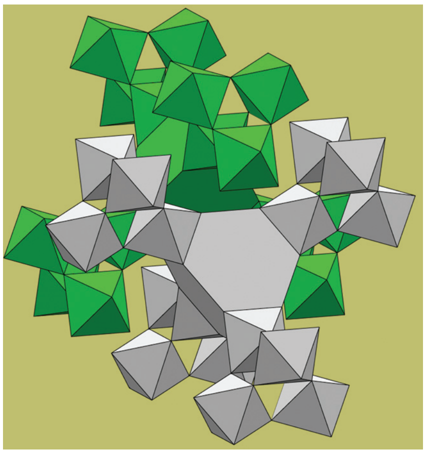

Plate XIII Two interwoven polyhedral D-nets.

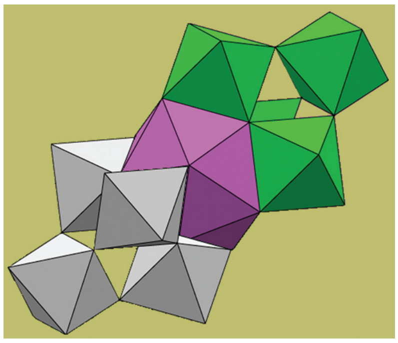

Plate XIV An icosahedron linking two pyrochlore units.

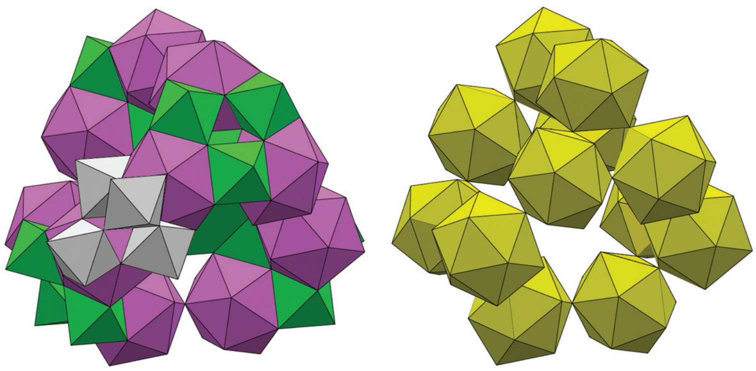

Plate XV (a) The $Mg_3Cr_2Al_{18}$ structure built from pyrochlore units and icosahedra. (b) The icosahedra form a network of vertex-sharing *L*-units.

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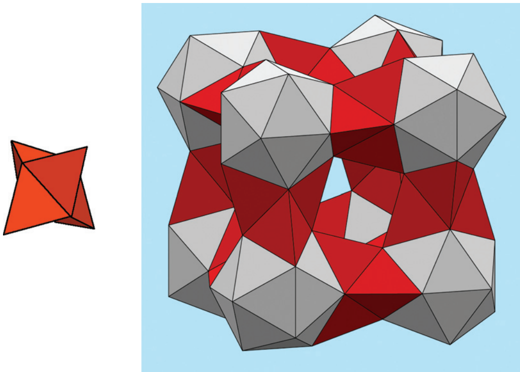


Plate XVI A *stella quadrangula* (four tetrahedra on the faces of a central tetrahedron, and (right) a polynet of icosahedra and *stellae quadrangulae*.

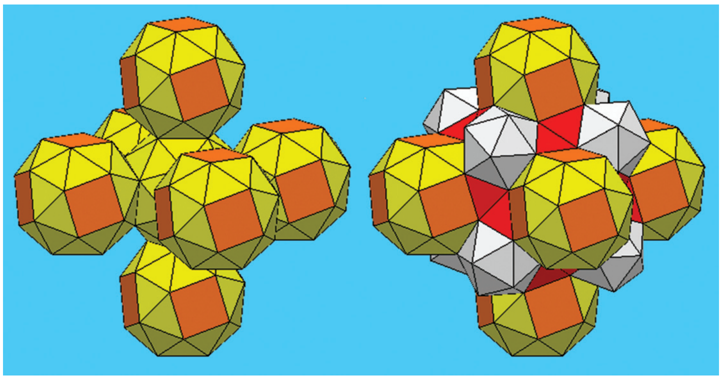


Plate XVII (a) An array of snub cubes. (b) The space filling packing of tetrahedra, icosahedra and snub cubes – a model of the structure of $NaZn_{13}$.

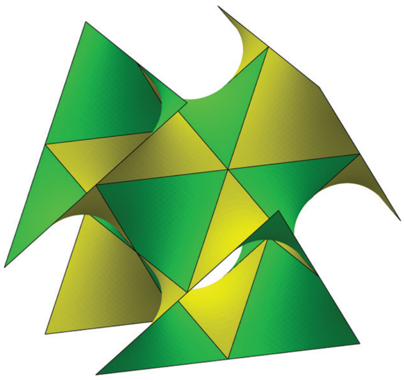
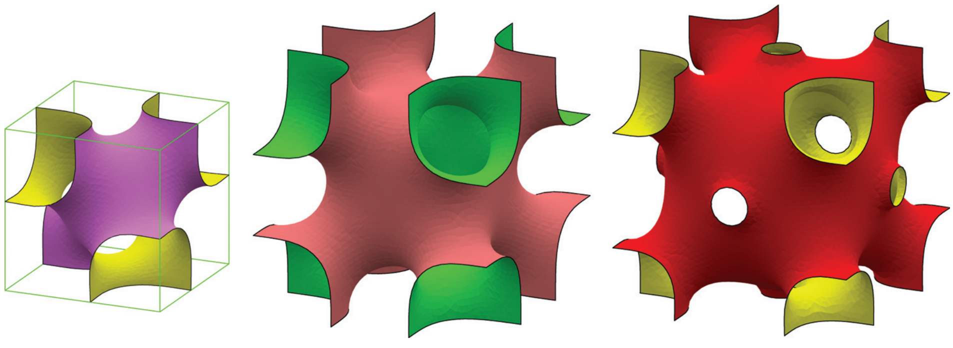


Plate XVIII A portion of the D-surface consisting of 18 Schwarz quadrilaterals.



(a) (b) (c)

Plate XIX Three TPMS generated by reflections, discovered by Alan Schoen: (a) 1/8 unit cell of FRD; (b) a unit cell of IWP. (c) OCTO (The faces of the bounding cubes in all three cases are mirror planes.)

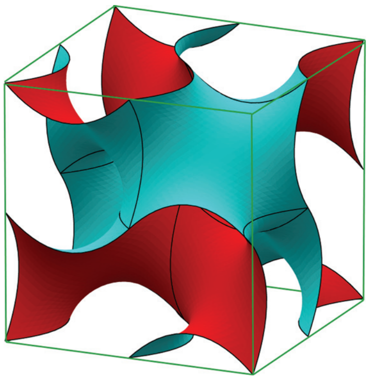


Plate XX A unit cell of the gyroid, discovered by Schoen.

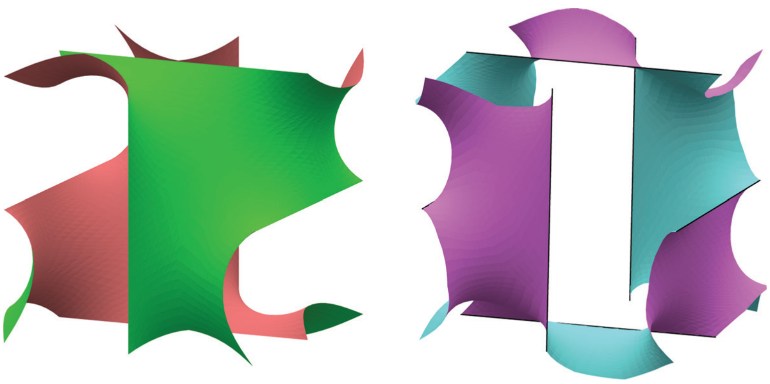


Plate XXI (a) Two nonagon generating patches in 1/8 unit cell of the surface C(±Y), and (b) two nonagons spanned by a 'catenoid-like' generating patch of ±Y.

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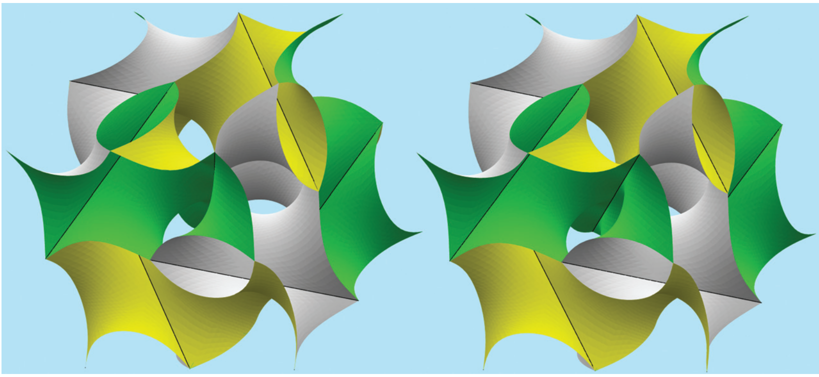

Plate XXII A stereo view of a unit cell of Elser's Archimedean screw.

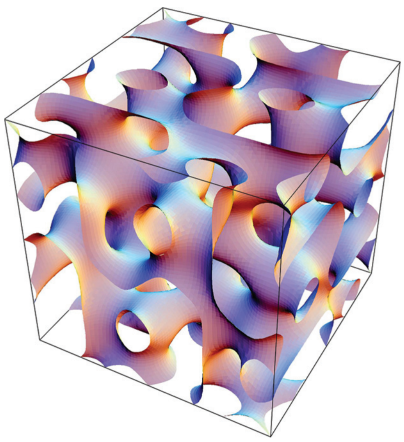

Plate XXIII von Schnering and Nesper's C(Y**), formula $3(\sin X\cos Y + \sin Y\cos Z + \sin Z\cos X) + 2(\sin 3X\cos Y + \sin 3Y\cos Z + \sin 3Z\cos X - \sin X\cos 3Y - \sin Y\cos 3Z - \sin Z\cos 3X) = 0$. This nodal surface has the same symmetries as the gyroid, I43d-$I4_132$. Whether a minimal surface exists with this topology and these symmetries is not known.

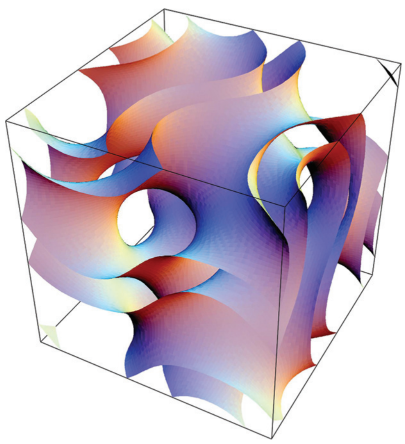

Plate XXIV A 'double gyroid". A nodal surface with the symmetry ($I4_132$) and topology of the family of constant mean surfaces to which the gyroid belongs. The formula is $0.8(\sin 2X\sin Y\cos Z + \sin 2Y\sin Z\cos X + \sin 2Z\sin X\cos Y) - 0.2(\cos 2X\cos 2Y + \cos 2Y\cos 2Z + \cos 2Z\cos 2X) + 0.33 = 0$.