

C₂₄₀ icosahedron–triangular panel of four graphite CFUs

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<http://web.me.com/whitby/Octahedron/Welcome.html>

References

1. Octahedron1stEd.pdf The octahedral periodicity of the Atomic Elements and its implications.

<http://homepage.mac.com/whitby/FileSharing103.html>

2. Atoms form quasicrystalline assemblies as panels, not as balls

<http://homepage.mac.com/whitby/Quasicrystals/FileSharing72.html>

<http://homepage.mac.com/whitby/Quasicrystals/FileSharing71.html>

<http://homepage.mac.com/whitby/Quasicrystals/FileSharing70.html>

3. C₆₀ icosahedron showing O-atom joining

<http://homepage.mac.com/whitby/Quasicrystals/FileSharing171.html>

4. C₆₀ icosahedron showing C-strand joining

<http://homepage.mac.com/whitby/Quasicrystals/FileSharing172.html>

5. Viral capsids. An excerpt from Reference 1 showing octahedral assemblies as icosahedral panels suggested by the protein structures of viral capsids.

<http://homepage.mac.com/whitby/BiologicalViruses/FileSharing88.html>

6. Crystal forming units. An excerpt from Reference 1.

<http://homepage.mac.com/whitby/Crystals/FileSharing92.html>

Introduction

The atoms defined by their octahedral periodicity are constrained to join to one another so that the octahedra which form them are edge-to-edge. [See Reference 1]

Eight C-atoms, each acting as a triangular panel, enclose a regular octahedral volume. In these positions, their centroids are at the vertexes of a cube. [See Reference 2].

In the same manner, twenty C-atoms, each acting as a panel enclose a regular icosahedral volume. In these positions, their centroids are at the vertexes of a pentagonal dodecahedron. Reference 3 shows how three C-atoms in the open face tetrahedral assembly of the graphite CFU can act as a panel of a regular icosahedron. This document shows how four graphite CFUs can act as a panel of a regular icosahedron.

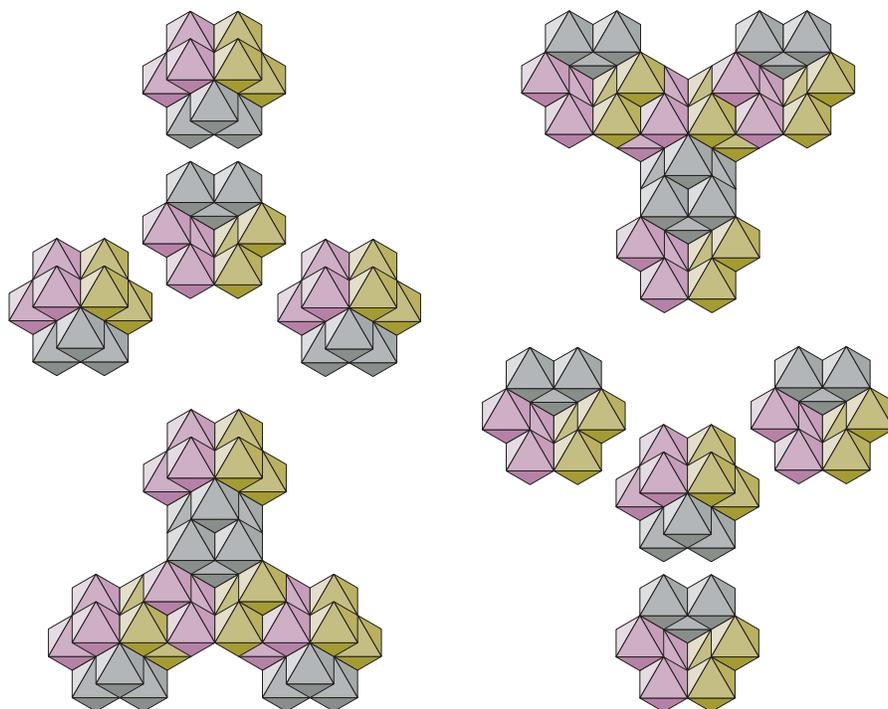


Fig. 1 Triangular panel of four graphite CFUs

The figure shows how four graphite CFUs of three C-atoms each can assemble as a triangular panel. The joins between the C-atoms of two different CFUs is identical to the join between the C-atoms of the CFUs in both the graphite and the diamond crystals.

At the upper left, four graphite CFUs are positioned to make the assembly in the lower left. The central CFU differs from the three adjoining CFUs by a half-turn rotation about the bottom edge of the page.

The obverse of the same assembly and its unjoined CFUs is shown on the right.

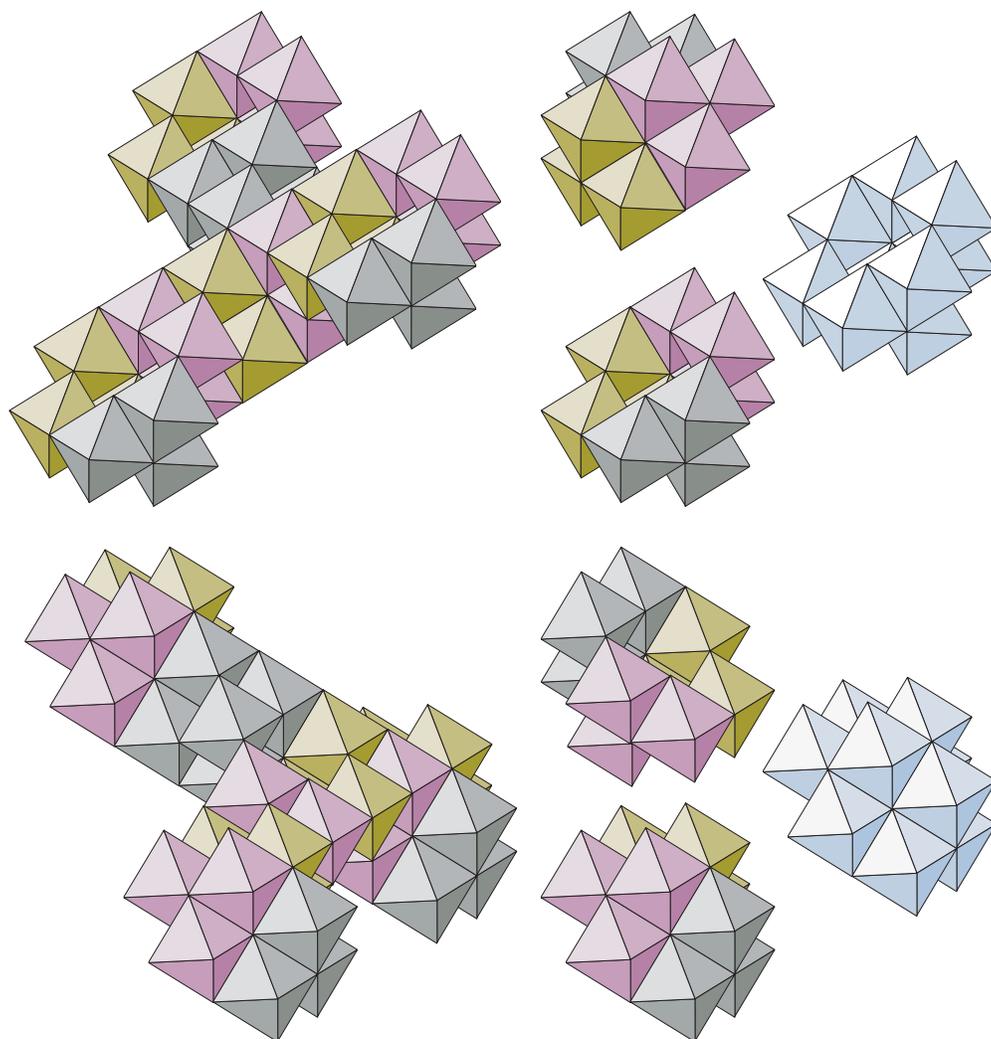


Fig. 2 Triangular panels of four graphite CFUs oriented icosahedrally

On the left, two panels of four graphite CFUs each are oriented to join as two faces of a regular icosahedral assembly.

In the middle, two CFUs are shown for each of the panels on the left. The CFUs have the same orientations as the CFUs which make up each of the panels

On the right, two graphite CFUs colored blue are oriented to join as two faces of a regular icosahedron. [Reference 3 shows how each is positioned in the icosahedral assembly.]

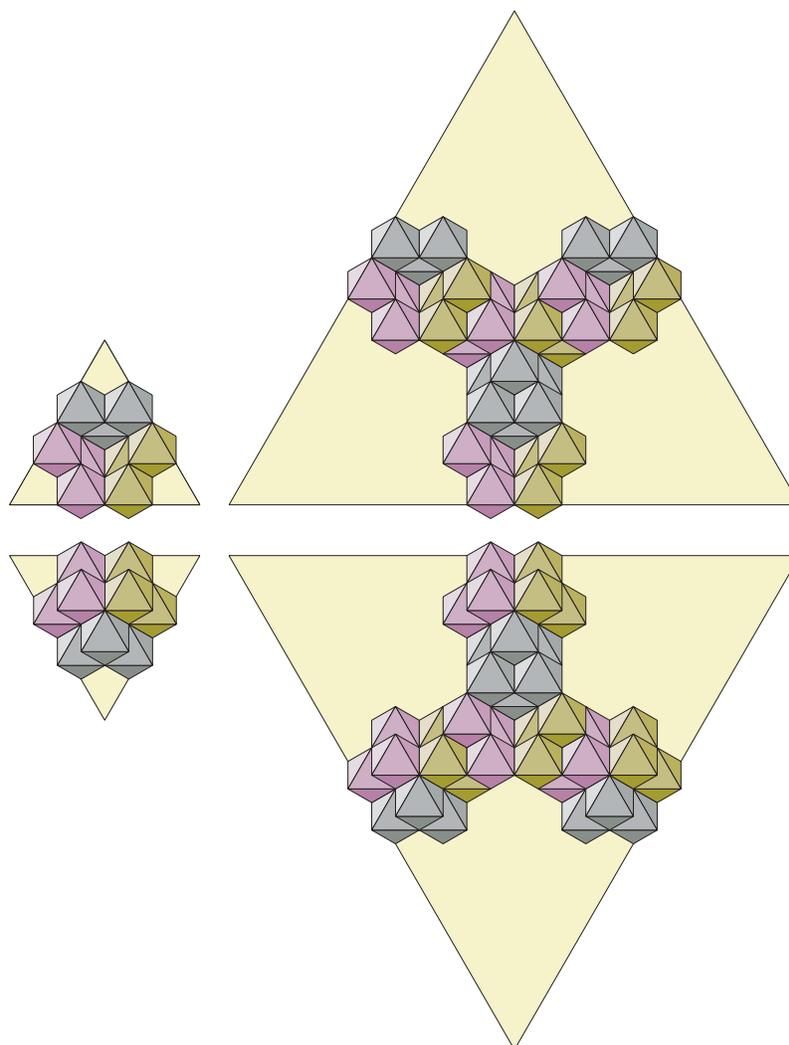


Fig. 3 Comparison of icosahedral panels of one and four graphite CFUs

At the left, an icosahedral panel consisting of a single graphite CFU is superimposed upon the icosahedral face it defines. The upper view is radially outward from the icosahedral centroid; the lower view is radially inward towards the icosahedral centroid.

At the right, an icosahedral panel consisting of four graphite CFUs, joined as they would be in forming a crystal of graphite, is superimposed upon the icosahedral face it defines. The upper view is radially outward from the icosahedral centroid; the lower view is radially inward towards the icosahedral centroid.