

Icosahedral assemblies of triangular panels of diamond CFUs

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

References

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

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Introduction

The number of C-atoms in an icosahedral assembly of identical triangular diamond panels is twenty times the number of CFUs in the panel times the number of C-atoms per CFU. The number of diamond CFUs in a triangular panel is the square of the number of CFUs along the panel's edge. The number of C-atoms in a diamond CFU is four. The table shows that the number of C-

Table 1: Icosahedral assemblies of triangular diamond panels

CFUs at edge	CFUs/panel	CFUs/icosahedron	C-atoms/icosahedron
1	1	20	80
2	4	80	320
3	9	180	720
4	16	320	1280
5	25	500	2000
6	36	720	2880
7	49	980	3920
8	64	1280	5120

atoms in icosahedral assemblies of triangular diamond panels produces a series that has been found among the fullerenes.

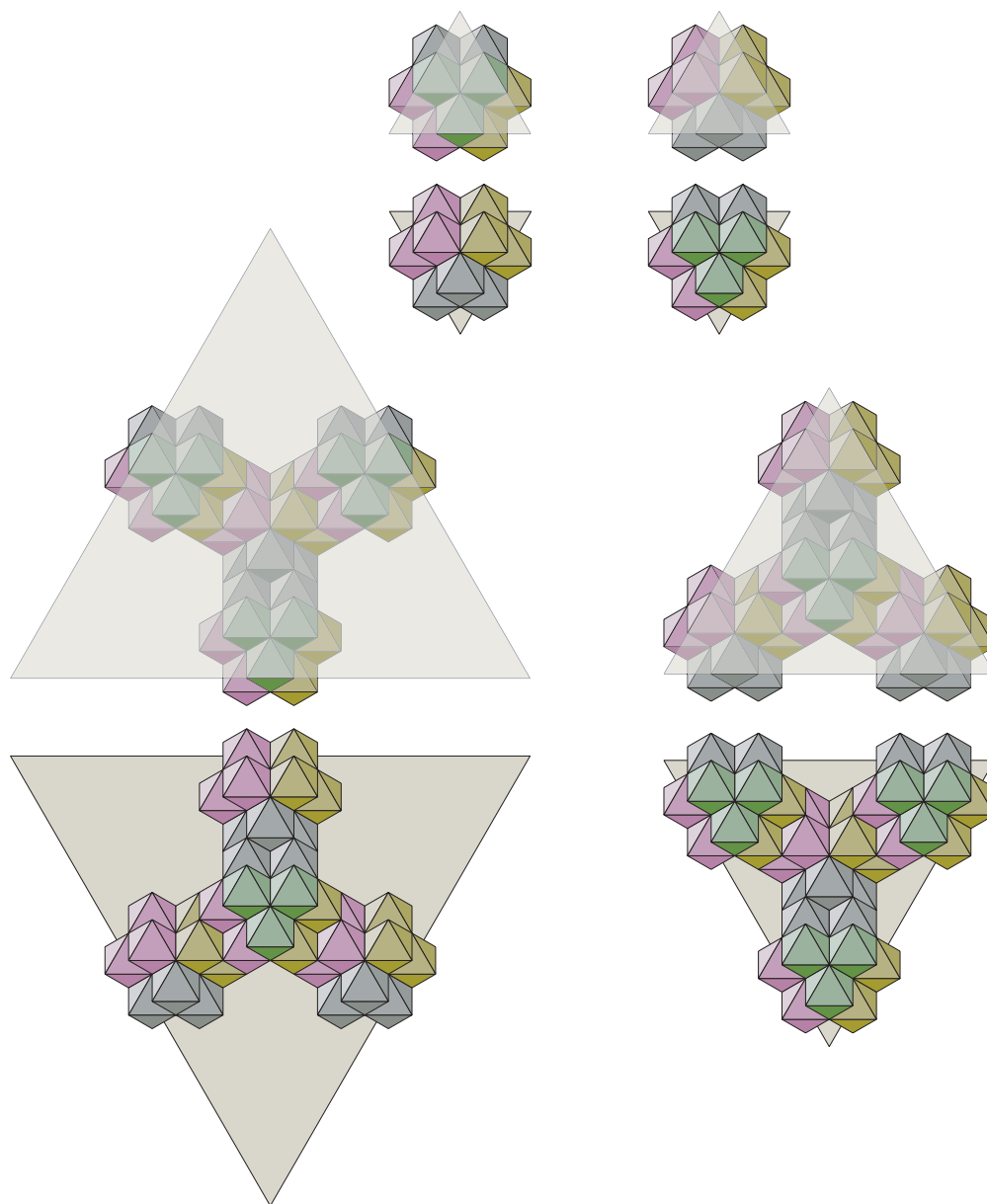


Fig. 1 Triangular panels of diamond CFUs for C_{80} and C_{320} fullerenes

The facial panel for the C_{80} fullerene is a single diamond CFU of four C-atoms, each of which acts as triangular panel of a regular tetrahedron. The CFU is shown at the top right of the figure. There are two ways in which the CFU can act as a panel—on the left, an edge of each He-octa of the green colored C-atom joins with an edge its counterpart in an identical CFU; on the right, an edge of a He-octa of each of three different C-atoms of a CFU joins with its counterpart in an identical CFU. The obverse of each panel is shown.

At the bottom of the figure, a triangular panel of four diamond CFUs acts in the same two ways to produce an icosahedral assembly. On the left, only the green colored C-atom of each of the three outer CFUs takes part in the interpanel joins. On the right, the interpanel join is between the violet C-atoms of two CFUs at one edge, the yellow C-atoms of two CFUs at the second edge, and the gray C-atom of two CFUs at the third edge.

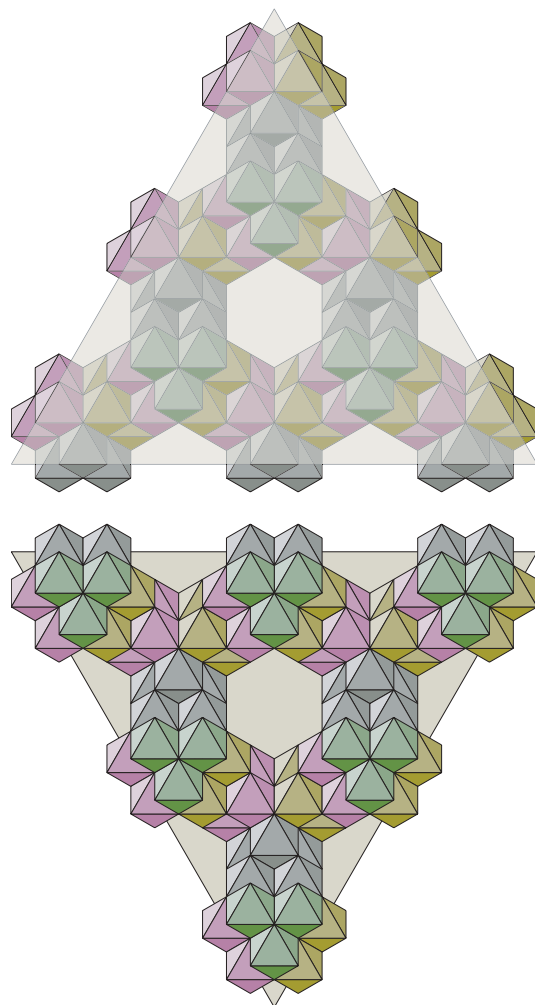


Fig. 2 Triangular panel of diamond CFUs for the C₇₀ fullerene

The figure shows a triangular panel of nine diamond CFUs from both the radially inward and the radially outward directions. The interpanel join along each edge is indicated by the transparent triangular overlay in the radially inward view at the top of the figure.

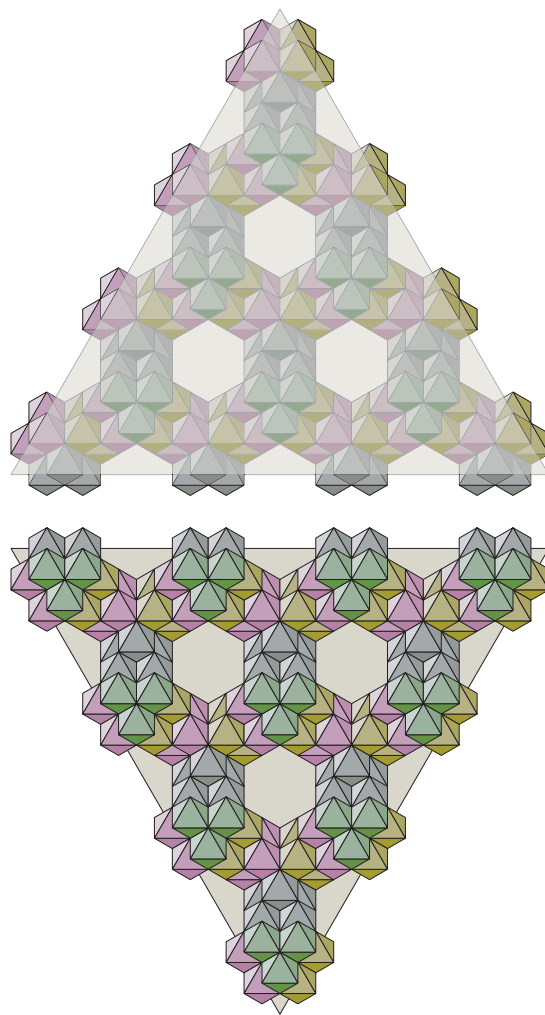


Fig. 3 Triangular panel of diamond CFUs for the C_{1280} fullerene

The figure shows a triangular panel of sixteen diamond CFUs from both a radially inward direction, top, and a radially outward direction, bottom. The transparent triangular overlay at the top shows the icosahedral face defined by the panel.

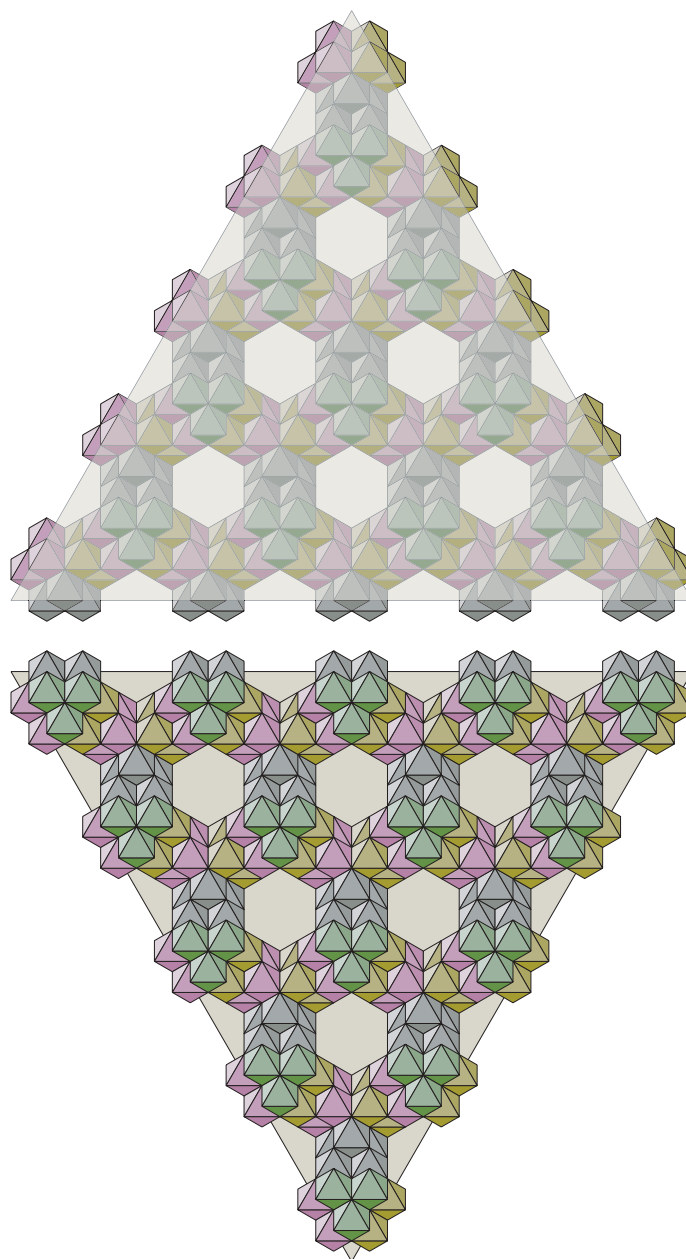


Fig. 4 Triangular panel of diamond CFUs for the C₂₀₀₀ fullerene
The figure shows a panel of twenty-five diamond CFUs from both a radially inward direction, top, and a radially outward direction, bottom.

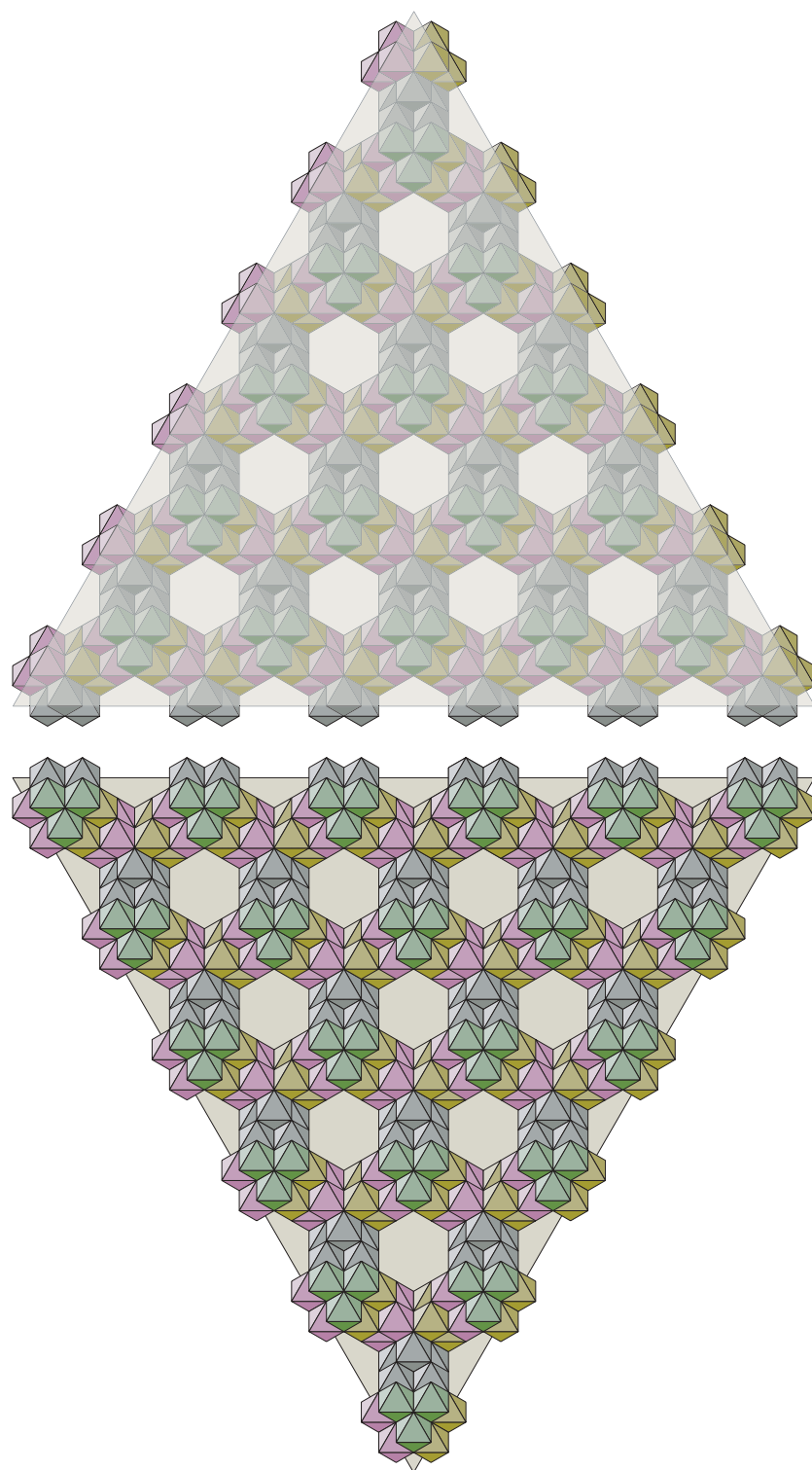


Fig. 5 Triangular panel of diamond CFUs for the C₂₈₈₀ fullerene

The figure shows a panel of thirty-six diamond CFUs from both a radially inward direction, top, and a radially outward direction, bottom.