

## Icosahedral assemblies of triangular graphite panels

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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. C<sub>60</sub> icosahedron** An icosahedral assembly of twenty graphite CFUs

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

**3. C<sub>240</sub> icosahedron** An icosahedral assembly of eighty graphite CFUs

<http://homepage.mac.com/whitby/Quasicrystals/FileSharing173.html>

### Introduction

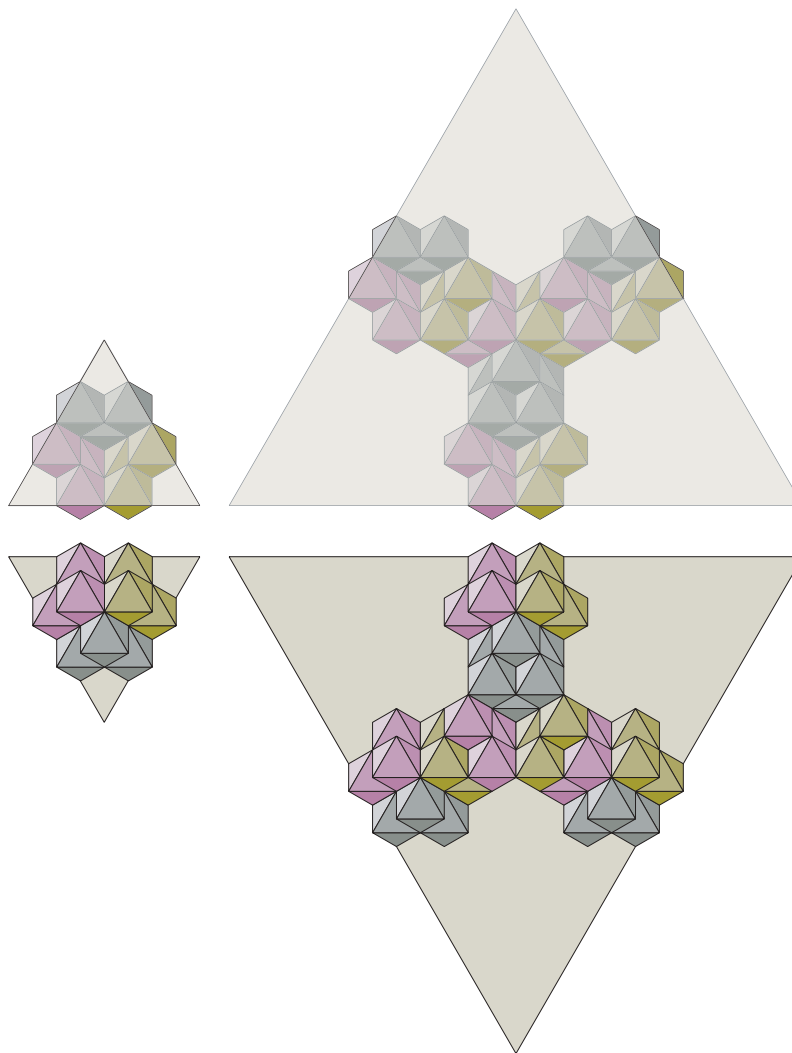
The number of C-atoms in an icosahedral assembly of identical triangular graphite panels is twenty times the number of CFUs in the panel times the number of C-atoms per CFU. The number of graphite CFUs in a triangular panel is the square of the number of CFUs along the panel's edge. The number of C-atoms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

**Table 1: Icosahedral assemblies of triangular graphite panels**

CFUs at edge	CFUs/panel	CFUs/icosahedron	C-atoms/icosahedron
1	1	20	60
2	4	80	240
3	9	180	540
4	16	320	960
5	25	500	1500
6	36	720	2160
7	49	980	2940
8	64	1280	3840

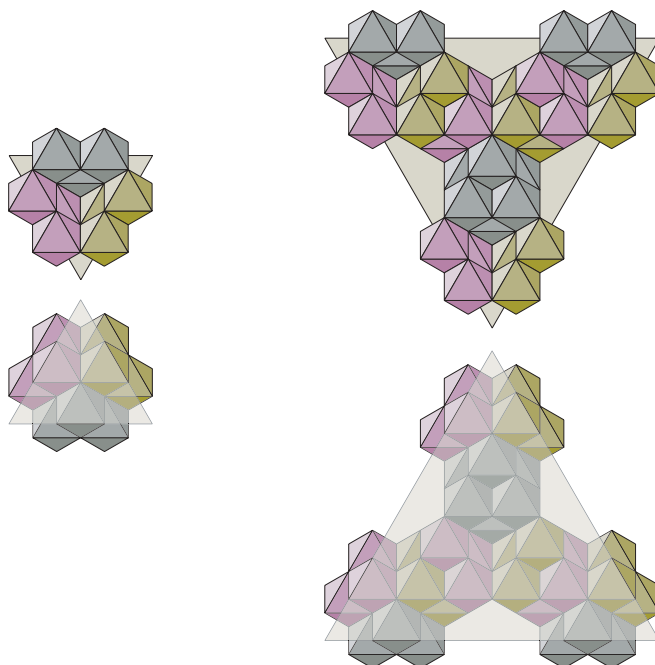
atoms in icosahedral assemblies of triangular graphite panels produces the same series as that which has been found for fullerenes.

Figures 1 through 5 show triangular graphite panels. Figures 6 through 13 show triangular graphite panels which have been vertexially truncated.



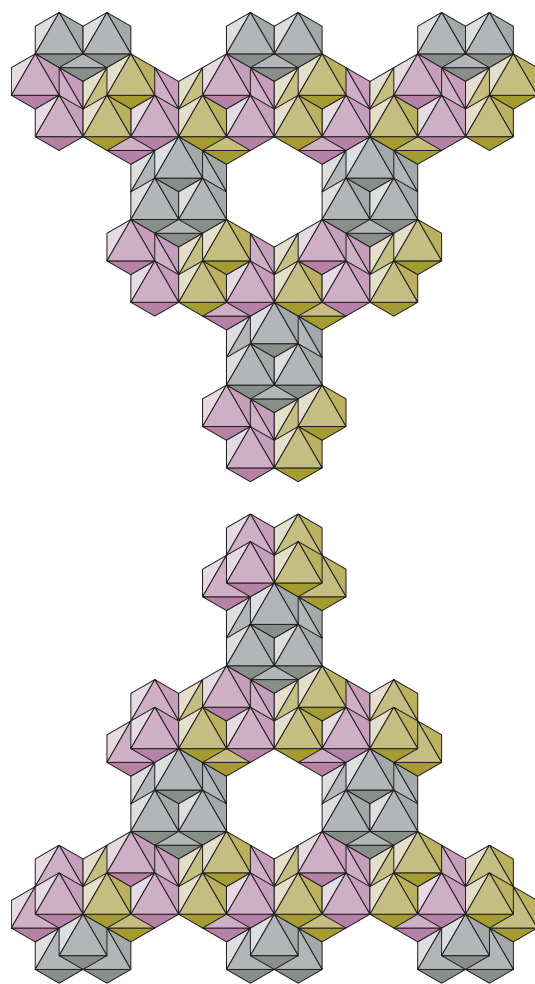
**Fig. 1 Icosahedral panels for  $C_{60}$  and  $C_{240}$  fullerenes**

The figure shows the graphite panel for the  $C_{60}$  fullerene on the left. The panel for the  $C_{240}$  fullerene is shown on the right. Each panel is shown from two directions—radially outward from the centroid of the icosahedral assembly and radially inward towards the centroid. Each view of each panel is accompanied by the icosahedral face it defines.



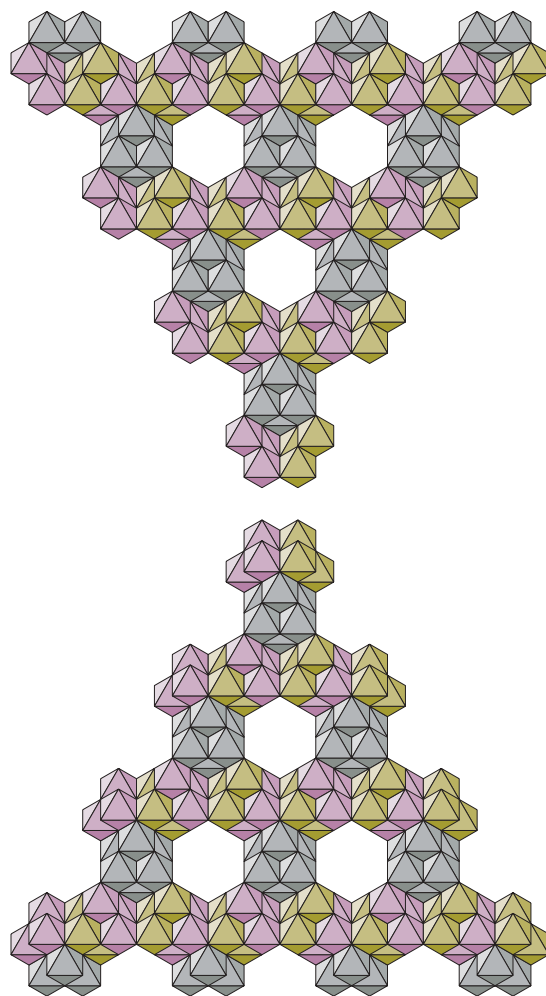
**Fig. 2 Icosahedral panels for  $C_{60}$  and  $C_{240}$  fullerenes—compact joining**

The figure shows the same two views of the two graphite panels which assemble as either the  $C_{60}$  or the  $C_{240}$  fullerene. The icosahedral faces each defines differs from the previous figure due to a different method of joining panel to panel. Here, the join is between a He-octa of a single C-atom of each of the graphite CFUs along the icosahedral edge; there, the join is between a He-octa of two C-atoms of each of the graphite CFUs along the icosahedral edge. The  $C_{60}$  panel has one graphite CFU; the  $C_{240}$  panel has four graphite CFUs.



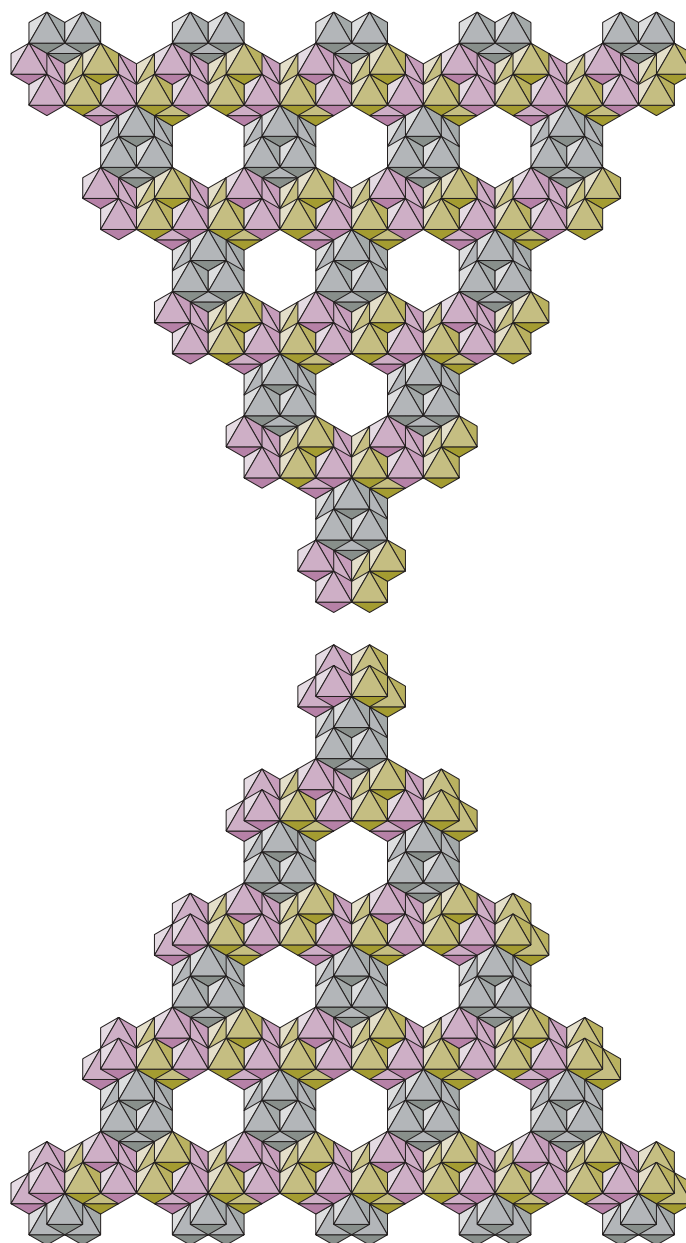
**Fig. 3 Icosahedral panel for the C<sub>540</sub> fullerene**

The figure shows the graphite panel for the C<sub>540</sub> fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of nine graphite CFUs.



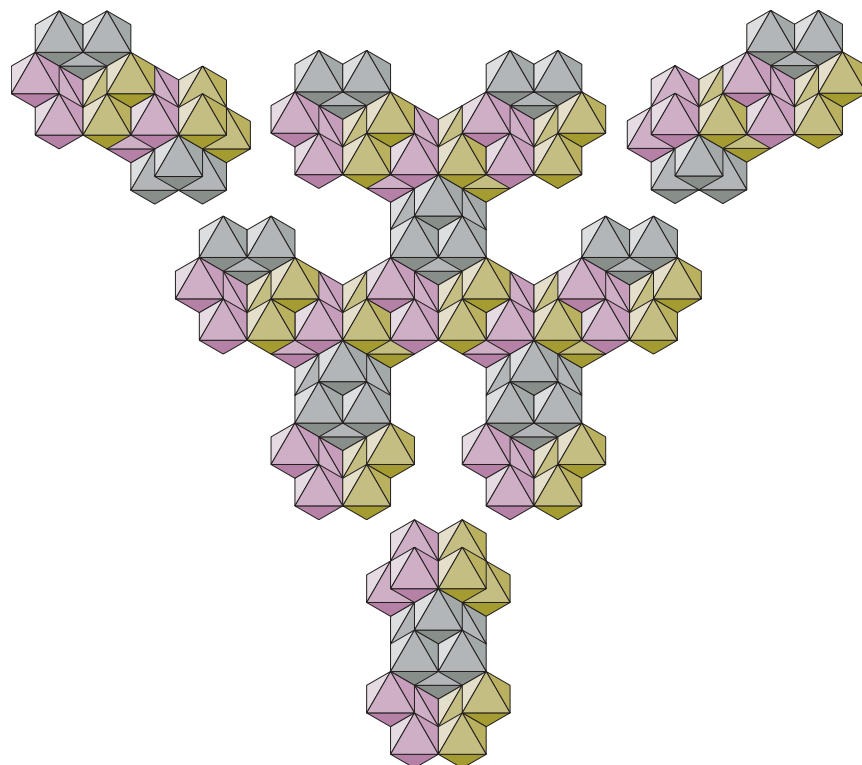
**Fig. 4 Icosahedral panel for the C<sub>960</sub> fullerene**

The figure shows the graphite panel for the C<sub>960</sub> fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of sixteen graphite CFUs.



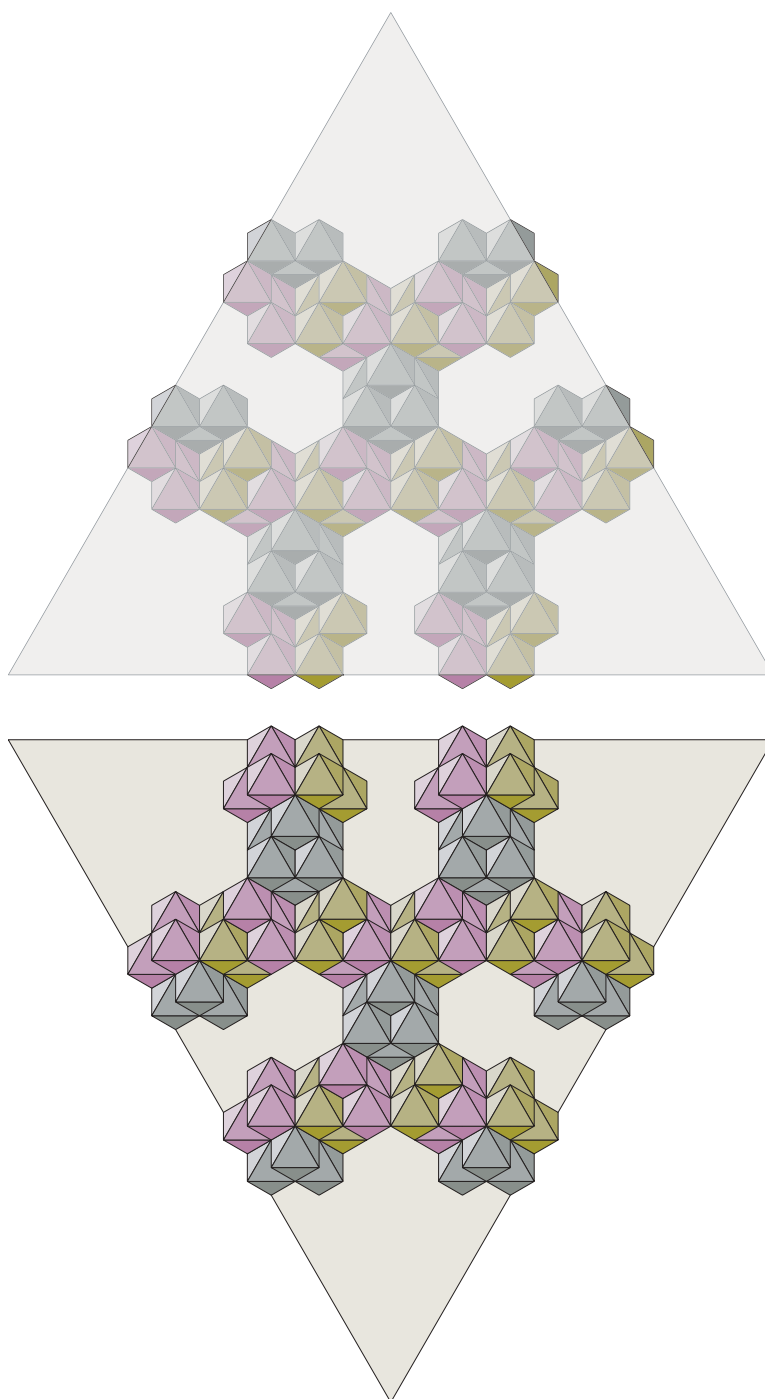
**Fig. 5 Icosahedral panel for the  $C_{1500}$  fullerene**

The figure shows the graphite panel for the  $C_{1500}$  fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of twenty-five graphite CFUs.



**Fig. 6 Icosahedral panel for the  $C_{600}$  fullerene**

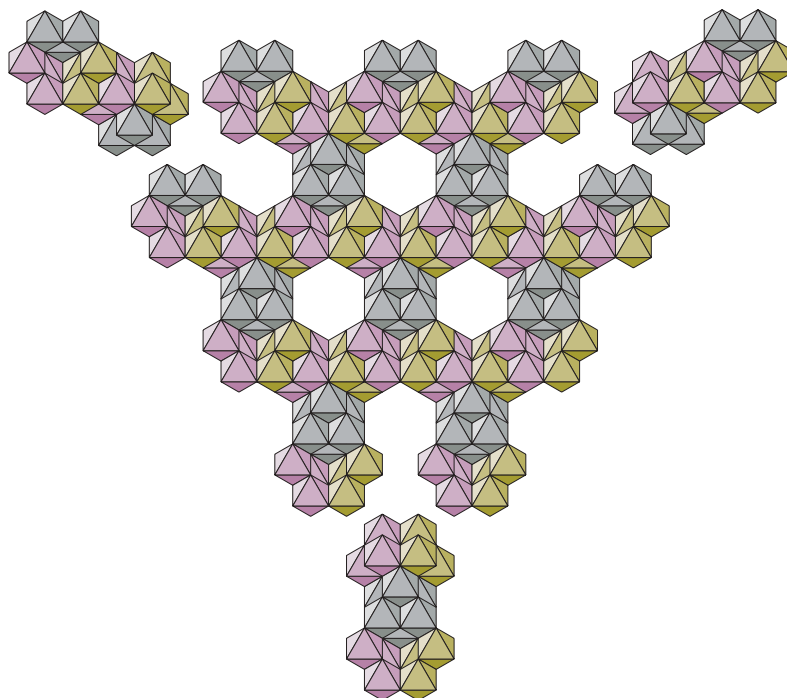
The figure shows the graphite panel for the  $C_{600}$  fullerene as a truncation of the graphite panel for the  $C_{960}$  fullerene. The panel consists of ten graphite CFUs—sixteen of the  $C_{960}$  panel less the six removed from its vertices by truncation.



**Fig. 7 Icosahedral panel for the C<sub>60</sub> fullerene**

The figure shows the graphite panel for the C<sub>60</sub> fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of ten CFUs.



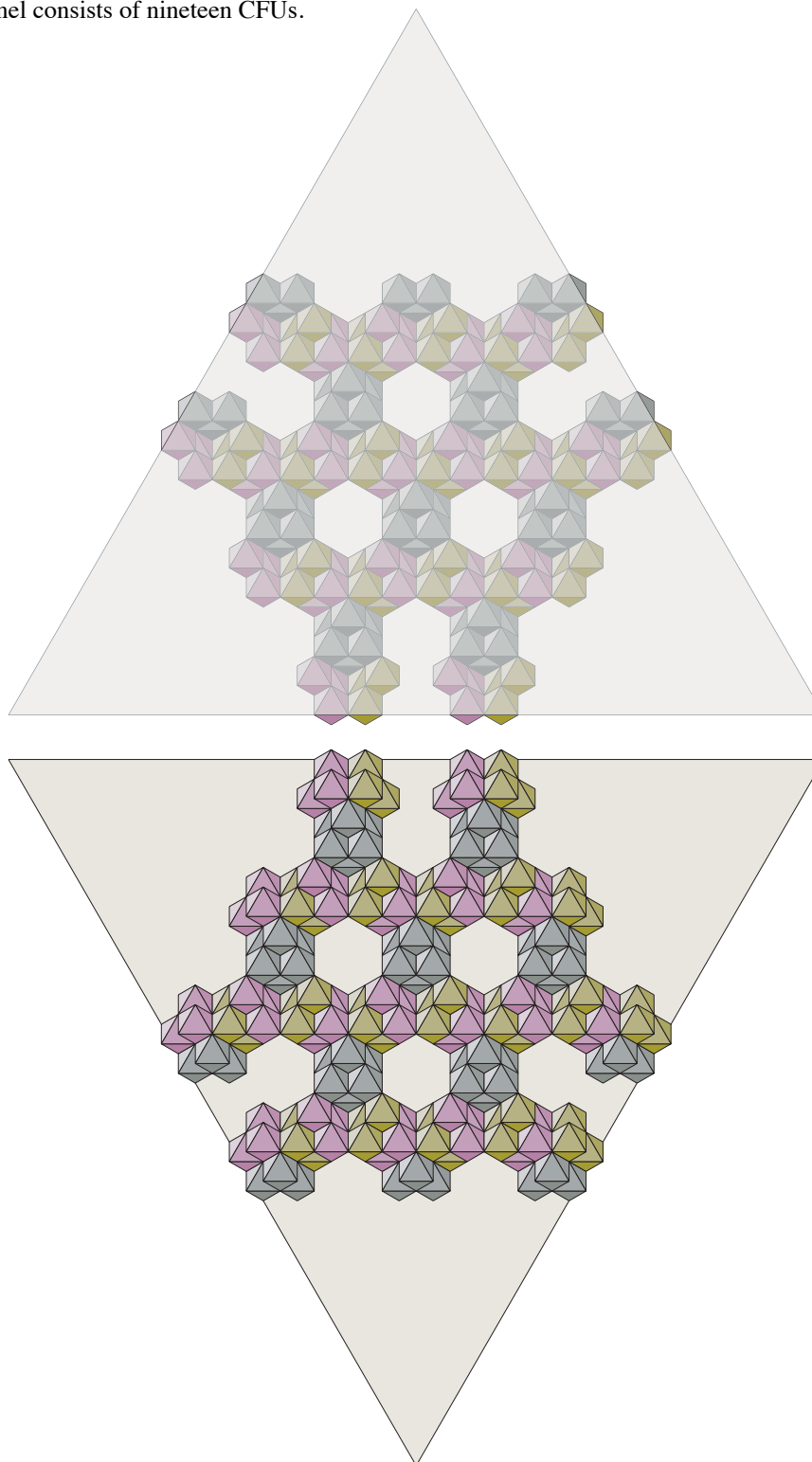


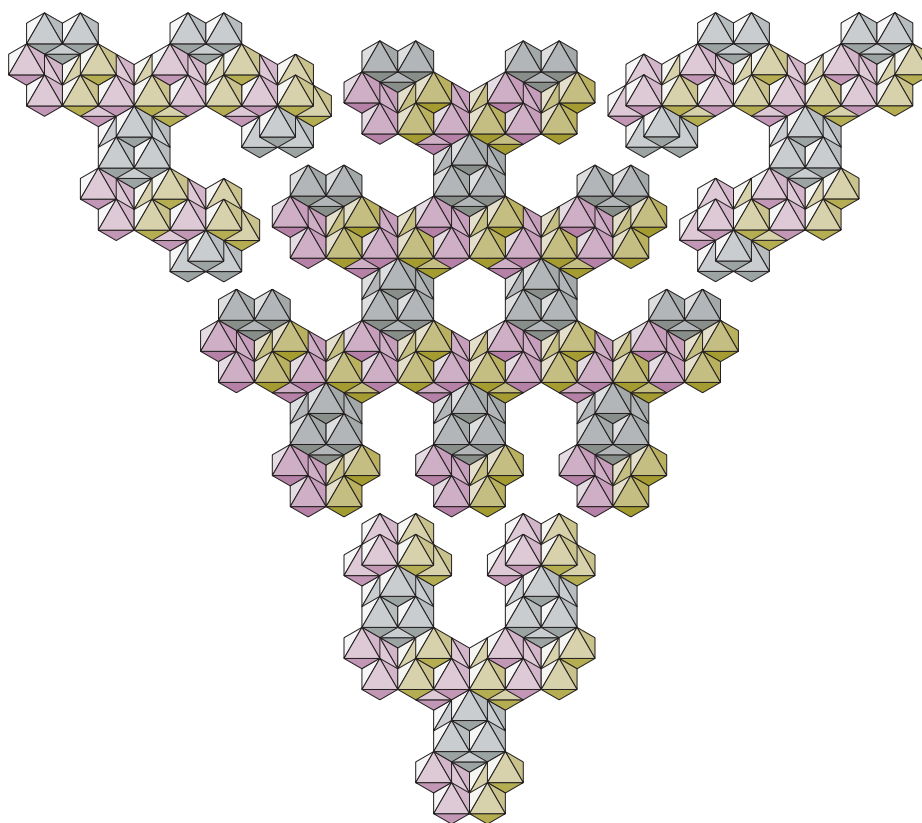
**Fig. 8 Icosahedral panel for the  $C_{1140}$  fullerene**

The figure shows the graphite panel for the  $C_{1140}$  fullerene as a truncation of the graphite panel for the  $C_{1500}$  fullerene. The panel consists of nineteen graphite CFUs—twenty-five of the  $C_{1500}$  panel less the six removed from its vertices by truncation.

**Fig. 9 Icosahedral panel for the  $C_{1140}$  fullerene**

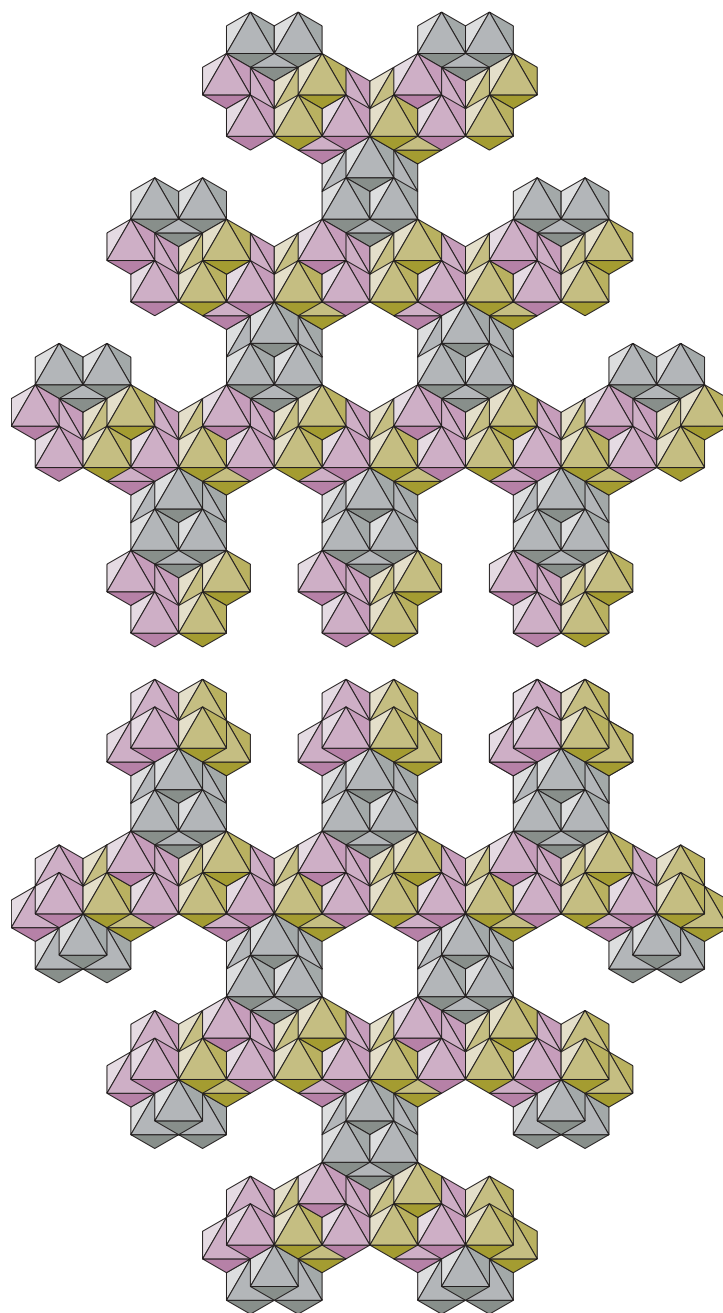
The figure shows the graphite panel for the  $C_{1140}$  fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of nineteen CFUs.





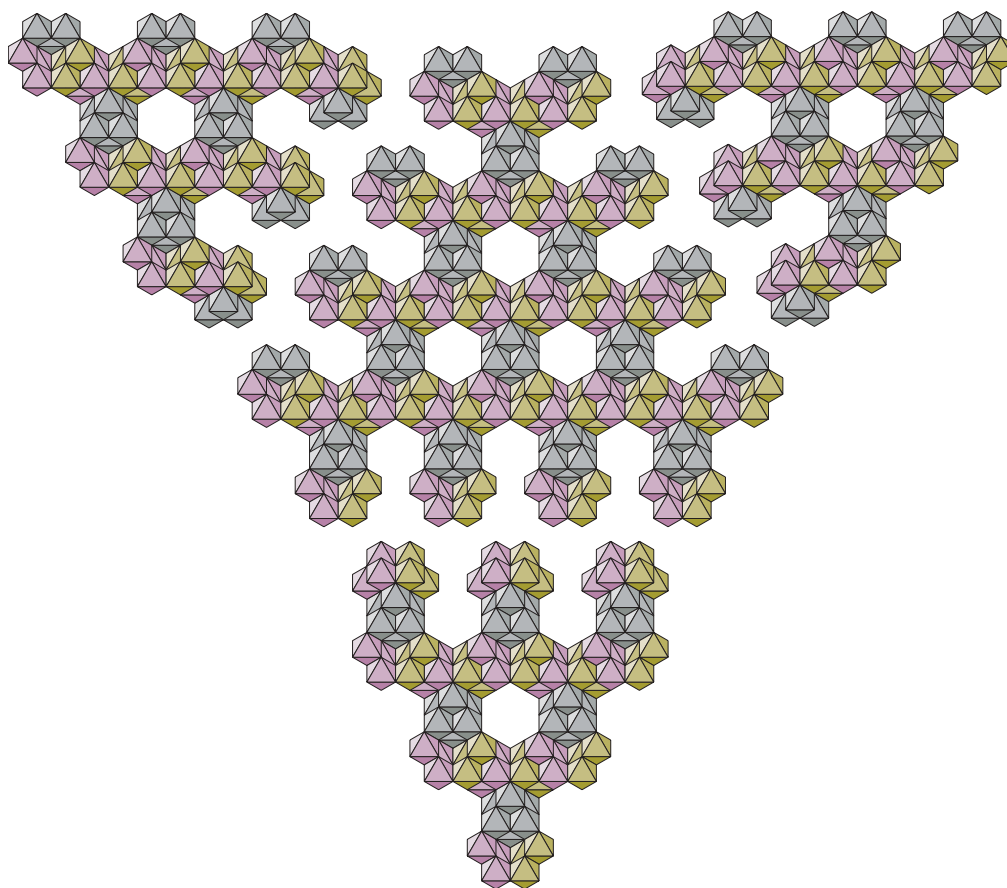
**Fig. 10 Icosahedral panel for the C<sub>1080</sub> fullerene**

The figure shows the graphite panel for the C<sub>1080</sub> fullerene as a truncation of the graphite panel for the C<sub>2160</sub> fullerene. The panel consists of eighteen graphite CFUs—thirty-six of the C<sub>2160</sub> panel less the eighteen removed from its vertexes by truncation.



**Fig. 11 Icosahedral panel for the C<sub>1080</sub> fullerene**

The figure shows the graphite panel for the C<sub>1080</sub> fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of nineteen CFUs.



**Fig. 12 Icosahedral panel for the  $C_{1680}$  fullerene**

The figure shows the graphite panel for the  $C_{1680}$  fullerene as a truncation of the graphite panel for the  $C_{3840}$  fullerene. The panel consists of twenty-eight graphite CFUs—sixty-four of the  $C_{3840}$  panel less the thirty-six removed from its vertexes by truncation.

**Fig. 13 Icosahedral panel for the  $C_{1680}$  fullerene**

The figure shows the graphite panel for the  $C_{1680}$  fullerene in two views—radially inward and radially outward from the icosahedral centroid. The panel consists of twenty-eight CFUs.

