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Counting (3,6)-fullerenes.

(3,6)-fullerenes are cubic plane graphs in which all faces are hexagons, except for four faces that are triangles. There is a standard way of representing these graphs by folding a plane hexagonal lattice onto a suitable tetrahedron. Fowler and Cremona showed how to determine the automorphism group from this representation, but the conditions are complicated. By using a slightly different representation we obtain simple conditions that determine the automorphism group and provide other structural information. We use this to provide counting formulae for (3,6)-fullerenes, and also related classes such as isolated-pentagon-triple (IPT)-fullerenes, with a given number of vertices. (Received September 13, 2010)