To the Editors:

I enjoyed "An Exact Value for Avogadro's Number," and found other ways of associating the authors' N_A* with a crystal structure. The authors' face-centered cube depicts 18 atoms, but only eight are part of a repeating unit cube forming a crystal lattice. The other 10 belong to adjacent unit cubes. So we could think of a cube holding Avogadro's number of atoms as made up of 10,555,736 unit cubes on an edge with each unit having eight atoms. This would indicate that Avogadro's number is perfect cube divisible by 8^3.

Another view can be obtained by rotating the face-centered cube 45 degrees clockwise to reveal a plane of tetrahedrons, each with four atoms bonded to a central one. We could twist the cube in space and locate three more views, each containing the same exact array of tetrahedrons. A basic unit of this lattice is a small rhomboid with nine atoms— one at each corner and one internal to the rhomboid. A tetrahedron is formed by four adjacent corner atoms bonded to the internal one. Two atoms of this rhomboid, the internal one and a corner one bonded to it, form a repeating unit of the crystal lattice. The other seven atoms belong to adjacent units.

So we could also think of a rhomboid containing Avogadro's number of atoms as having 42,223,444 unit rhomboids on an edge with each unit having two atoms, one corner atom and the central tetrahedral atom bonded to it. This would indicate that Avogadro's number is divisible by 2^3.

Finding that N_A* is divisible by 2^3 and 8^3 is a rather interesting result, but there are others. The first eight cubic divisors of N_A* are I^3, 2^3, 4^3, 8^3, 17^3, 34^3, 68^3 and 136^3. The cube 1^3 is associated with a perfect cube. The cubes 2^3 and 8^3 are associated with a rhomboid and face-centered cube, respectively. That leaves at least five other perfect cubes. Are there more? Can spatial configurations be attached to the other nine perfect cubes that the authors have set aside?

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