Icosahedral Snowflakes?

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Abstract

Long before the discovery of H, O, and H_2O, Johannes Kepler proposed, incorrectly but astutely, that hexagonal snowflakes grow by the accretion of invisible spherical particles in a densely packed array. And so the science of crystallography was born. Half a milennium later, once-thought-to-be-impossible icosahedral crystals again raised the question of growth and form, but for these crystals their relation remains murky.

Two models, decorated tilings and nested clusters, have been used to describe the arrangements of atoms in icosahedral crystals. But both models have trouble with growth. In this talk I will discuss a particular case, the Yterrbium-Cadmium icosahedral crystal and its close periodic relatives, and show how a modified cluster model may show us a way out.

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