Zinc snowflakes

The metal gallium is liquid at room temperature, which gives the chemical element all sorts of unique properties (see the article by Michael Dickey, PHYSICS TODAY, April 2021, page 30). Shuhada Idrus-Saidi and Jianbo Tang, of the University of New South Wales in Australia, and their colleagues recently used gallium as a metallic solvent in their synthesis of crystalline structures made of zinc, shown in this tinted photo. Because of gallium's 30 °C melting point, it remained liquid when a gallium–zinc alloy was heated and subsequently cooled, which yielded solid zinc crystals. Like snowflakes formed from ice crystals, the zinc snowflakes have a highly ordered, hexagonal-like structure. Yet each one also has unique branching and needle-like components.

Zinc crystals can't be sieved and filtered from liquid gallium in the same way that particles are separated from an aqueous solution or an organic solvent. To isolate the zinc snowflakes, the researchers tuned the electrical properties of the gallium to break its surface tension. Then the gallium was carefully vacuum filtrated from the delicate snowflakes. The researchers are hopeful that their methods can offer a new manufacturing pathway for growing complex metallic nanostructures. (S. A. Idrus-Saidi et al., *Science* **378**, 1118, 2022; image courtesy of Jianbo Tang.) —AL

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