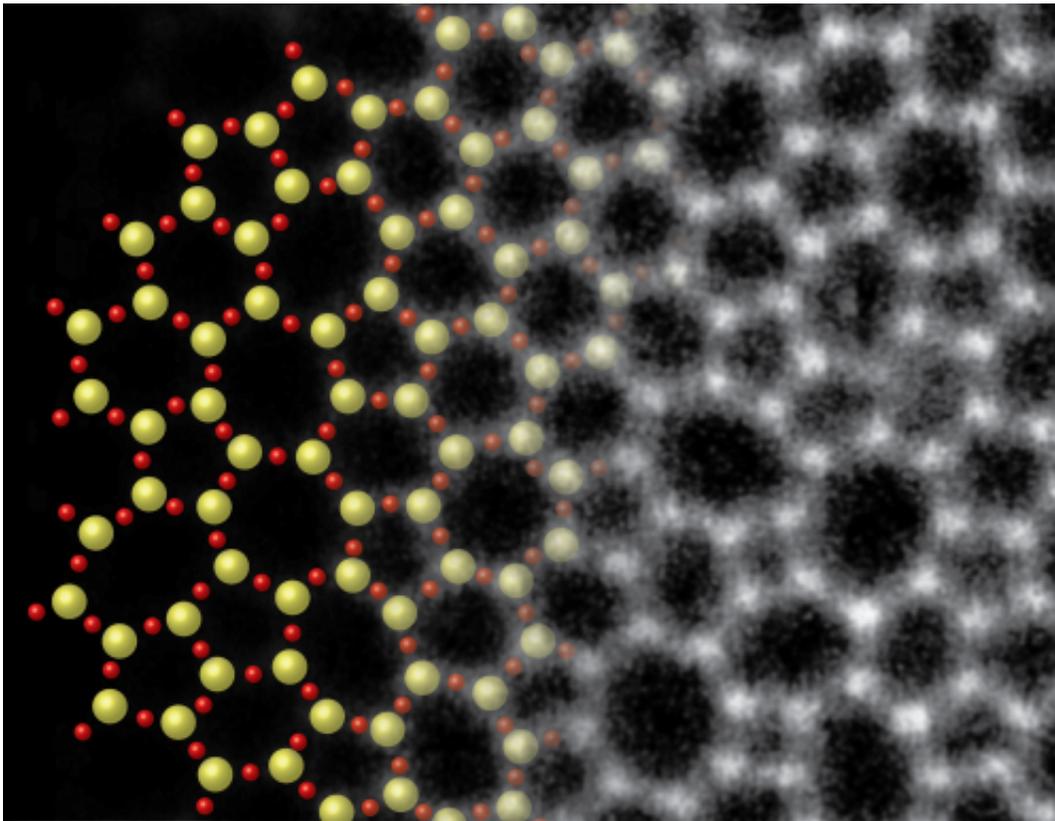


# Guinness record: World's thinnest glass is just two atoms thick

September 12 2013, by Syl Kacapyr

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A microscopic photo of a sheet of glass only two atoms thick blends with an artist's conception to show the structural rendering. Credit: Kavli Institute at Cornell for Nanoscale Science.

(Phys.org) —At just a molecule thick, it's a new record: The world's thinnest sheet of glass, a serendipitous discovery by scientists at Cornell

and Germany's University of Ulm, is recorded for posterity in the Guinness Book of World Records.

The "pane" of glass, so impossibly thin that its individual silicon and [oxygen atoms](#) are clearly visible via [electron microscopy](#), was identified in the lab of David A. Muller, professor of applied and [engineering physics](#) and director of the Kavli Institute at Cornell for Nanoscale Science.

The work that describes direct imaging of this thin glass was first published in January 2012 in *Nano Letters*, and the Guinness records officials took note. The record will now be published in the Guinness World Records 2014 Edition.

Just two atoms in thickness, the glass was an accidental discovery, Muller said. The scientists had been making graphene, a two-dimensional sheet of [carbon atoms](#) in a chicken wire crystal formation, on copper foils in a quartz furnace. They noticed some "muck" on the graphene, and upon further inspection, found it to be composed of the elements of everyday glass, silicon and oxygen.

They concluded that an air leak had caused the copper to react with the quartz, also made of silicon and oxygen. This produced the glass layer on the would-be pure graphene.

Besides its sheer novelty, Muller said, the work answers an 80-year-old question about the fundamental structure of glass. Scientists, with no way to directly see it, had struggled to understand it: it behaves like a solid, but was thought to look more like a liquid. Now, the Cornell scientists have produced a picture of individual atoms of glass, and they found that it strikingly resembles a diagram drawn in 1932 by W.H. Zachariasen – a longstanding theoretical representation of the arrangement of atoms in glass.

"This is the work that, when I look back at my career, I will be most proud of," Muller said. "It's the first time that anyone has been able to see the arrangement of atoms in a glass."

What's more, two-dimensional glass could someday find a use in transistors, by providing a defect-free, ultra-thin material that could improve the performance of processors in computers and smartphones.

**More information:** [DOI: 10.1021/nl204423x](https://doi.org/10.1021/nl204423x)

Provided by Cornell University

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