
The Crystal Growers Behind the Graphene Revolution

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Takashi Taniguchi and Kenji Watanabe create high-quality crystals that offer the perfect substrate on which to tailor-make two-dimensional materials with amazing electronic properties. They tell New Scientist how they grow their world-renowned crystals

FOR years, Takashi Taniguchi and Kenji Watanabe were like most other physicists, labouring away relatively unknown to the wider world. The pair studied crystals in their lab at the [National Institute for Materials Science](#) near Tokyo, [Japan](#).

Then, almost overnight, they hit the big time. They had been growing a cubic crystal form of boron nitride that has the same three-dimensional structure as diamond. One day, out of curiosity, they investigated another type of boron nitride crystal that sometimes grew as a by-product in their lab – a flat, two-dimensional form.

With it, they inadvertently struck gold. That's because, around this time, another 2D substance was starting to make waves. Graphene, formed of a sheet of carbon just a single atom thick, was dubbed a "wonder material" due to it being a great conductor, stronger than diamond and lighter than paper. An influx of graphene research began, trying to make the most of this stuff.

The problem was, to study graphene, you need something very flat with just the right properties on which to mount the wafer thin sheets. The solution, it turned out, was the very by-product crystals Taniguchi and Watanabe had been investigating.

Their high-purity 2D boron nitride crystals are, by wide consensus, the world's best. Today, what was once a waste material is supplied to everyone in the graphene field to enable groundbreaking research and the two scientists are co-authors of more than 1000 studies.

They told New Scientist how they honed their craft, found themselves at the centre of a materials revolution and became the world's most in-demand crystal growers.

Read the [original article](#) on New Scientist.