# Flaky graphene makes reliable chemical sensors

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Scientists from the University of Illinois at Urbana-Champaign and the company Dioxide Materials have demonstrated that randomly stacked graphene flakes can make an effective chemical sensor.

The researchers created the one-atom-thick carbon lattice flakes by placing bulk graphite in a solution and bombarding it with ultrasonic waves that broke off thin sheets. The researchers then filtered the solution to produce a graphene film, composed of a haphazard arrangement of stacked flakes, that they used as the top layer of a chemical sensor. When the graphene was exposed to test chemicals that altered the surface chemistry of the film, the subsequent movement of electrons through the film produced an electrical signal that flagged the presence of the chemical.

The researchers experimented by adjusting the volume of the filtered solution to make thicker or thinner films. They found that thin films of randomly stacked graphene could more reliably detect trace amounts of test chemicals than previously designed sensors made from carbon nanotubes or graphene crystals.

The results are accepted for publication in the AIP's journal Applied Physics Letters.

The researchers theorize that the improved sensitivity is due to the fact that defects in the carbon-lattice structure near the edge of the graphene flakes allow electrons to easily "hop" through the film.

**More information:** Amin Salehi-Khojin et al. "Chemical Sensors Based On Randomly Stacked Graphene Flakes", accepted for publication in *Applied Physics Letters.*

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