But studies on Alpha and other variants cannot be easily generalized to Delta, says Steven Riley, an infectious-diseases researcher at Imperial College London.

So far, there are no published data on how vaccines affect infections and infectiousness with Delta, but a UK study[5] published on 21 July shows that the Pfizer–BioNTech and Oxford–AstraZeneca vaccines both protect slightly less well against symptomatic disease caused by Delta than against that caused by Alpha. This could also mean a drop in how well they protect against transmission of Delta, but there is still a lot of uncertainty, says Dean.

And case numbers have risen sharply in Israel since Delta's arrival, despite more than 60% of the population being fully vaccinated. This hints at what might happen elsewhere, say researchers.

Even if vaccines are just as effective at preventing infections with Delta as with earlier variants, if Delta is more infectious, transmission in households could still increase, says Dean.

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WATER TRANSFORMED INTO SHINY, GOLDEN METAL

Droplet of sodium and potassium donates electrons that make water metallic.

By Davide Castelvecchi

If you can't turn water into gold as a good alchemist would, the next best thing might be to transform it into a shiny, metallic material. Researchers have achieved that feat by forming a thin layer of water around electron-sharing alkali metals.

The water stayed in a metallic state for a only few seconds, but the experiment did not require the high pressures that are normally needed to turn non-metallic materials into electrically conductive metals.

Co-author Pavel Jungwirth, a physical chemist at the Czech Academy of Sciences in Prague, says that seeing the water take on a golden shine was a highlight of his career. The team published its findings on 28 July in *Nature*[1].

"This is a most important advance," says Peter Edwards, a chemist at the University of Oxford, UK. "Who would have thought it … bronze, metallic water?"

Metallic non-metals

In theory, most materials are capable of becoming metallic if put under enough pressure. Atoms or molecules can be squeezed together so tightly that they begin to share their outer electrons, which can then travel and conduct electricity as they do in a chunk of copper or iron. Geophysicists think that the centres of massive planets such as Neptune or Uranus host water in such a metallic state, and that high-pressure metallic hydrogen can even become a superconductor, able to conduct electricity without any resistance.

Turning water into a metal in this way would require an expected 15 million atmospheres of pressure, which is out of reach for current laboratory techniques, says Jungwirth. But he suspected that water could become conductive in an alternative way: by borrowing electrons from alkali metals. These reactive elements in group 1 of the periodic table, which includes sodium and potassium, tend to donate their outermost electron. Last year, Jungwirth and his colleague Phil Mason — a chemist who is also known for making science videos on YouTube — led a team that demonstrated a similar effect in ammonia[2]. The fact that ammonia can turn shiny in such conditions was known to the British chemist Humphry Davy in the early nineteenth century, Edwards points out.

Electrons from sodium and potassium diffuse onto water, turning it golden.

PHILIP E. MASON

The team wanted to try the same approach with water instead of ammonia, but faced a challenge: alkali metals tend to react explosively when mixed with water. The solution was to design an experimental set-up that would dramatically slow the reaction so that it would not be explosive. The researchers filled a syringe with sodium and potassium, a mixture that is liquid at room temperature, and placed it in a vacuum chamber. They then used the syringe to form droplets of the metal mixture and exposed them to small amounts of water vapour. The water condensed onto each droplet and formed a layer one-tenth of a micrometre thick. Electrons from the droplet then quickly diffused into the water — together with positive metallic ions — and, within a few seconds, the water layer turned golden.

Timing is crucial

Experiments at a synchrotron X-ray source in Berlin confirmed that reflections from the sample produced the signatures expected of metallic water. The key to avoiding an explosion, Jungwirth says, was to find a window of time in which the diffusion of electrons was faster than the reaction between the water and the metals. "They have managed to get to a quasi-steady state such that the physics of metallization wins over chemical decomposition," Edwards says.

"We were not sure at all that we would find it," Jungwirth says. "It was amazing, like [when] you discover a new element."

Jungwirth says the experiment was a refreshing break from his day job, which is to run computer simulations in organic chemistry, and a reminder that science can be fun. "It's not something you can get grant money for, but something you can do on your weekends," he says. It's not the first time he has collaborated with Mason on a practical experiment: in 2015, the two researchers and their colleagues revealed the mechanism that makes sodium explode when it touches water[3] — an experiment they set up on a balcony at their institute, because they didn't have access to a lab. "That pissed everybody off, because that was where people went smoking," he recalls. "We said: could we have the balcony for explosions?"

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