Nanoscale Schottky diodes fabricated via adhesion lithography

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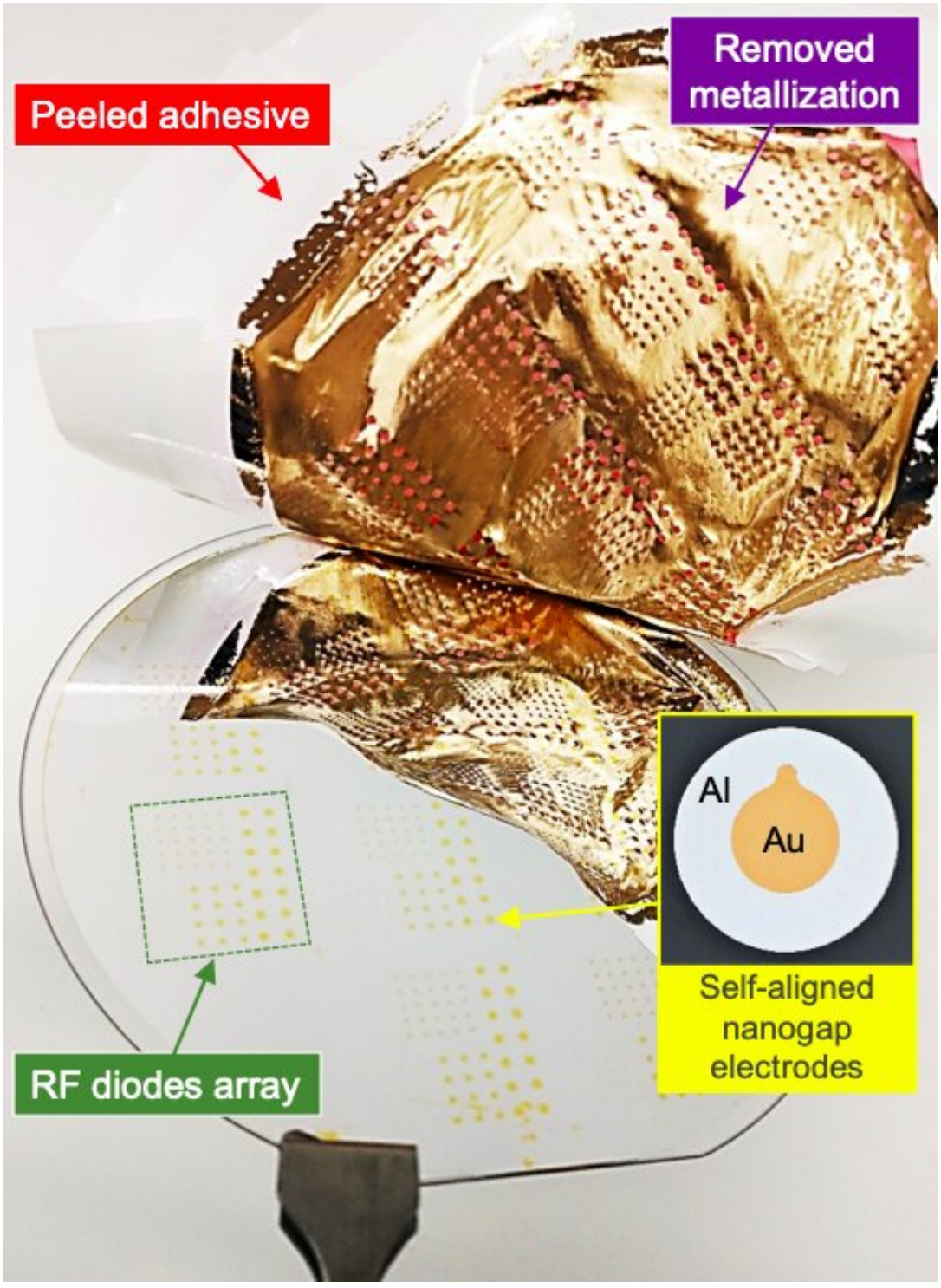

Planar nanogap electrodes manufactured on a glass wafer using adhesion-lithography. Credit: Georgiadou et al.

To fabricate nanoscale photonic and electronic devices, engineers need electrodes made of asymmetric metals separated by gaps in the nanometer (nm) length scale. So far, most of these electrodes were fabricated using high-end patterning techniques, such as electron-beam lithography.

While electron-beam lithography has been found to enable high-fidelity patterning in asymmetric metal electrodes, it also comes with a number of limitations. For instance, it is typically very difficult to apply on a larger scale, as it can only process a limited number of items simultaneously and it is only effective on some materials.

Researchers at King Abdullah University of Science and Technology (KAUST) and Imperial College London introduced an alternative method that could be potentially used to fabricate asymmetric nanogap electrodes on a large scale. Recently, they used this technique, first presented a few years ago in a paper published in *Nature Communications*, to fabricate nanogap electrode devices.

"Our recent study is based on a serendipitous discovery that my group made back in 2014; that of a method (i.e., adhesion-lithography or 'a-Lith') that can be used to pattern two electrodes made of the same or different metals less than 15 nm apart from each other," Thomas D. Anthopoulos, the lead researcher who carried out the study, told TechXplore. "Although our initial interest was to fabricate self-aligned gate transistors, we soon realized that the self-aligned electrodes were separated by a tiny distance (i.e., a nanogap that is