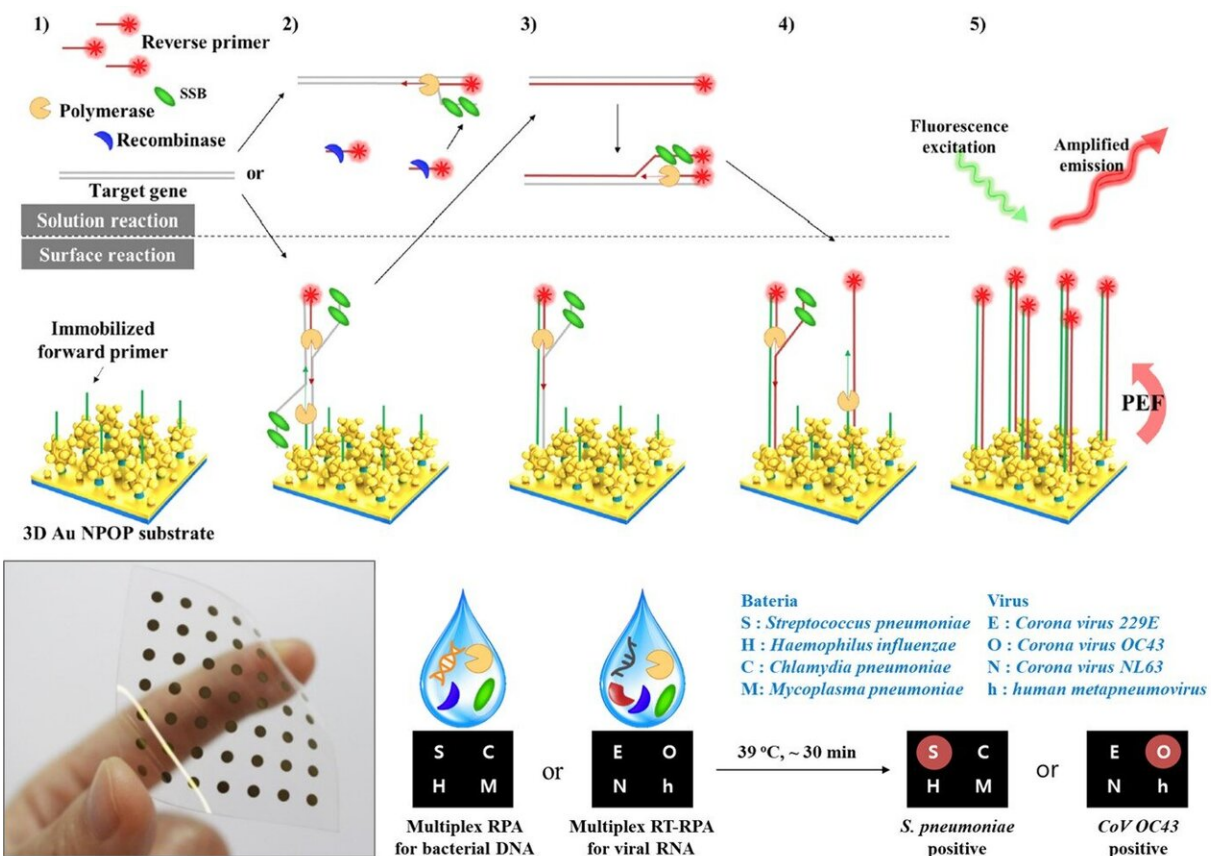


Respiratory viral pathogens like SARS-CoV-2 easy to test on-site with new nanofilm

April 15 2021



Schematic illustrations of solid-phase multiplex RPA on the 3D plasmonic chip. Credit: Korea Institute of Materials Science (KIMS)

Researchers in South Korea have developed a plasmonic isothermal recombinase polymerase amplification (RPA) array chip. This first

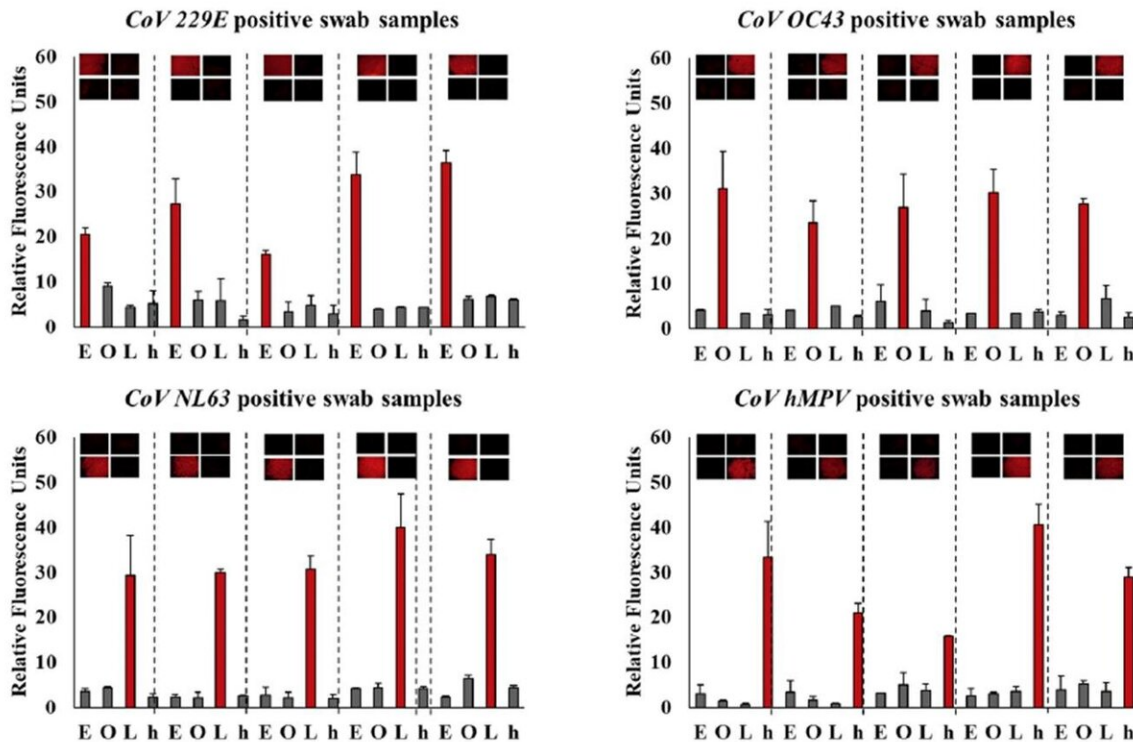
plasmonic isothermal PCR technology can detect eight types of pathogens (four bacteria and four viruses) that cause acute respiratory infectious diseases; the analysis takes only 30 minutes. The research was led by Dr. Sung-Gyu Park and Dr. Ho Sang Jung of the Korea Institute of Materials Science (KIMS, President Jung-Hwan Lee) and by Dr. Min-Young Lee and Dr. Ayoung Woo of Samsung Medical Center.

The current detection technology for COVID-19 is impossible to use on-site, as results take about four hours or more after specimen collection, making it difficult to isolate the patient quickly.

To solve this problem, the researchers combined isothermal PCR technology with a 3D Au-nanostructured substrate that can amplify the fluorescence signal of RPA products with DNA amplicons and successfully detect bacterial DNA and viral RNA within 30 minutes.

In addition, the research team also developed a 3D plasmonic array chip for multiplex molecular detections. This is a chip that can simultaneously analyze eight [pathogens](#) (four bacteria and four viruses).

This multiplex diagnosis technology is also applicable to nasopharyngeal swabs. The team is planning to perform the reliability test of medical devices through large-scale clinical trials on COVID-19 patients and is applying for approval from the Ministry of Food and Drug Safety.



Preliminary clinical evaluation of the plasmonic RT-RPA array chip using nasopharyngeal swab samples. Credit: Korea Institute of Materials Science (KIMS)

"We developed a [medical device](#) that can detect pathogens in half an hour on-site, by developing core plasmonic nanomaterials that enable ultra-sensitive pathogene diagnosis of more than 10 types of respiratory viral pathogens. The on-site molecular diagnostic devices can be deployed rapidly as we actively research with Samsung Medical Center and domestic diagnostic [device](#) companies," said Dr. Sung-Gyu Park, a principal research scientist of KIMS.

More information: Ayoung Woo et al, Rapid and sensitive multiplex molecular diagnosis of respiratory pathogens using plasmonic isothermal RPA array chip, *Biosensors and Bioelectronics* (2021). [DOI](#):

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