

Research team invents new chemical detector

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A team of researchers at the University of Delaware's Catalysis Center for Energy Innovation (CCEI) recently invented the Quantitative Carbon Detector (QCD), a new device that identifies and quantifies chemical compounds in complex mixtures such as fuels, oils, chemicals, pharmaceuticals and food. This instrument will have a significant impact on the amount of time required for chemical analysis.

The center's research focuses on discovering new technologies for the production of renewable fuels and chemicals using lignocellulosic (non-food) biomass as feedstocks.

A major challenge in the catalytic conversion of biomass to fuels is the molecular transformation that requires detailed and simultaneous characterization of complex mixtures containing hundreds of [chemical compounds](#).

"The QCD is really the holy grail of chemical analysis," says Paul J. Dauenhauer, associate professor of chemical engineering and materials science at the University of Minnesota and co-director of CCEI.

"Utilizing this new technology allows us to focus our effort on catalytic science rather than tedious and expensive chemical calibrations."

Using an integrated microreactor design, multiple catalytic reactions break down complex chemical mixtures into single compounds, significantly reducing the time and effort required for characterization analyses. Microchannels that surround a built-in heating system allow for high-resolution chemical detection as well as integration of hardware and

software within existing [chemical](#) analysis devices.

The research was published in the January issue of the journal *Lab on a Chip*, a publication of the Royal Society of Chemistry.

"A major challenge in any energy and fuels laboratory is identifying the chemicals within liquid substances," says Alex Paulsen, CCEI researcher and co-inventor. "After being identified, each compound must be quantified, and this can be a time-consuming procedure for complex mixtures. By breaking down the mixtures into single compounds, the QCD simplifies the process so we have more time to focus on research."

This [new technology](#), Polyarc QCD, is currently being developed by Activated Research Company (ARC), a new start-up based in Minnesota. Pre-orders for the device are being accepted.

More information: For more information, see www.efrc.udel.edu/

Provided by University of Delaware

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