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Systems and Methods for Integrated Detection

Electrochemical sensors that can quickly, selectively, and sensitively detect unknown chemicals in air or water are vital for many applications. These include environmental monitoring, biomedical diagnostics, security applications, and food and drinking water safety. Current electrochemical sensors fail to detect low concentrations of important analytes and are often highly dependent on the environmental conditions. In addition, electrical sensors are typically large and can be expensive to manufacture.

To overcome these drawbacks, researchers at the Biodesign Institute of Arizona State University have developed an integrated sensing device capable of detecting an analyte using a combination of electrochemical, electrical, and/or optical signals.

The device consists of three electrodes connected via bridging materials. The analyte is placed on the bridging materials between the electrodes and can be analyzed through optical transmission mode or through electrical measurements through the electrode. Additionally, the bridging materials can be modified with recognition elements for enhanced selectivity in chemical detection.

The device that has been developed introduces synergetic capabilities and enhances the sensitivity and selectivity for real-time detection of an analyte in complex matrices.

Potential Applications

- Environmental detection and protection
- Security Applications
- Food and drinking water safety
- Biomedical analysis

Benefits and Advantages

- Combines three sensing platforms for increased sensitivity and accuracy
- Detects analytes in liquids, gases, cultures and biological tissues in real time or close to real time

For more information about the inventor(s) and their research, please see [Dr. Forzani's directory webpage](#)[Dr. Tao's directory webpage](#)[Dr. Tao's laboratory webpage](#)[Dr. Tao's Biodesign directory webpage](#)

