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## Thin Film Cocaine Sensors

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### ABSTRACT

Over 7 million Americans suffer from a drug use disorder and up to 60% of individuals treated for addiction will ultimately relapse. We are developing ultra-thin film electrodes on a wearable substrate for a sensor that can detect minute amounts of cocaine in sweat droplets secreted from the skin. This will enable wearable drug monitoring for personalized rehabilitation treatment plans and improve long-term addiction recovery rates. The current research focuses on developing a thin-film sensor that can be applied directly to the skin. First a layer of PVP (poly4-vinylphenol) was prepared and then spun coated onto a piece of glass. This adhesive coated glass acted as a substrate for assembling the sensors. Silver reference electrodes were generated by evaporating silver through a stencil, which contained 1mm by 10mm slits, in a vacuum sealed chamber. The resulting electrodes were tested to verify their conductivity, stability, and reactivity. Upon successfully demonstrating these characteristics, a second stencil was made to evaporate both gold and silver to make a working electrode surface that will react with a cocaine solution, making the first prototype that can successfully detect cocaine.

### KEYWORDS

Sweat Sensor, Drug Use Monitoring, Cocaine, Organic Electronics, Wearable Sensor