Microfabricated Sensor for Detection of Trace VOC's

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Abstract

Gold nanoparticle chemiresistors can be used for early detection of lung cancer, diagnosing diabetes, and monitoring air quality control. Chemiresistors are sensors that measure a resistance change of volatile organic compounds (VOC's) in environmental air. The gold nanoparticle chemiresistors are made from interdigitated electrodes which are made by using microfabrication techniques and are 400µm 400µm. Different thiol modified gold nanoparticle thin films are pipetted onto the interdigitated electrodes to make it possible for detection of trace amounts of VOC's from 10 ppm to 0.1 ppm. This is done by measuring the resistance difference between the sensors in synthetic air and target VOC's in air, such as acetone and benzene. By using a four-channel flow control unit we are able to dilute the VOC analyte to lower concentrations to determine the traceable limit each sensor can detect. By testing the limits of these sensor, we are able to know the sensitivity and limit of detection of each different thiol modified gold nanoparticle sensor. These sensors could eventually be used for sensor array or electronic nose in labs and homes to detect specific carcinogenic VOC's including benzene and formaldehyde in the air.

Biography

My name is Josh Brodzik and I am currently an undergraduate student at Georgetown College double majoring in chemistry and physics. Previously, I worked with the Derby Research Group at the University of Minnesota on the Analysis of Bridgman Growth of Scintillator Crystals. This summer I am working with Dr. Fu at the University of Louisville on Microfabricated Sensors for Detection of Trace VOC's. I am a current member of the American Chemical Society and the chemical honor society Gamma Sigma Epsilon at Georgetown College. I am a member of Alpha Lambda Delta honor society as well.