Nanocomposite Film for Volatile Organic Compound Sensing

Traditional gas sensors can be complicated and often unresponsive

Gas sensors play a critical role in everyday life by detecting specific gases in the environment for diverse applications, including industrial safety and exposure monitoring. Portable and cheap gas sensors can be used to provide real-time monitoring of targeted gases, including volatile organic compounds (VOCs). Chemoresistors are a type of VOC sensor that works by changing their electrical resistance in the presence of the VOC. These chemoresistors are small, cheap, and easy to use, making them ideal for fieldwork.

New innovation allows for adjustable resistance and detection sensitivity

Researchers at the Georgia Institute of Technology have developed a new type of chemoresistor in which conductive nanoparticles, consisting of either gold or silver, are surrounded by a polymer matrix. The resistance of the resulting
nanocomposite can be changed by adjusting the interparticle distance within the nanoparticle-polymer composite. This adjustment is achieved through the swelling or shrinking of the polymer network induced by VOC-polymer interactions. The result is a simple and sensitive chemoresistor capable of working for a diverse range of VOCs.

The invention is a new type of chemoresistor capable of sensing volatile organic compounds (VOCs). The chemoresistor is comprised of a conductive nanoparticle surrounded by a polymer matrix. This design allows for the chemoresistor’s resistance, sensitivity, and target VOC to be adjusted. The nanocomposite can be placed on electrodes through drop casting, dip coating, and painting, which provides a cheap, simple and sensitive sensor ideal for fieldwork.

Summary Bullets

- The invention is a new type of chemoresistor capable of sensing volatile organic compounds (VOCs).
- The chemoresistor is comprised of a conductive nanoparticle surrounded by a polymer matrix which allows for the chemoresistor’s
  resistance, sensitivity, and target VOC to be adjusted.

- The nanocomposite can be placed on electrodes through drop casting, dip coating, and painting, which provides a cheap, simple and sensitive sensor ideal for fieldwork.

Solution Advantages

- Adjustable resistance of nanoparticle-polymer composite allows for indicating the amount of VOC that should trigger the sensor
- Detection sensitivity and selectivity can be tailored by Henson solubility parameters to specify the VOC

Potential Commercial Applications

- Environmental Monitoring
- Food Quality Control
- Medical Diagnostics
- Process Control

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Publications

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Images

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