

Abstract Submitted
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Flexible Polymer Nanocomposite Hydrogen Sensors by Solution Processes¹ HOWARD WANG, YAYONG LIU, LIWEI HUANG, KAIKUN YANG, LIANFENG ZOU, State University of New York, Binghamton, CHEOL PARK, National Institute of Aerospace — Using solution processes such as flow coating and inkjet printing, flexible hydrogen sensors arrays have been fabricated on thin polymer nanocomposite films containing dispersed palladium nanoparticles (Pd-NPs). Composite films were annealed at temperatures from 150 °C to 200 °C to allow Pd-NPs to sinter and form a conductive network. An optimal processing temperature is found to yield the most sensitive sensors due to a good balance between the electrical resistance and connectivity of the Pd-NP network. As-fabricated hydrogen sensors can detect a hydrogen level of ca. 200 ppm or lower with a response time of less than 1 second upon the exposure to hydrogen gas, and a recovery time of *ca.* 5 min upon the removal of hydrogen. The sensitivity, repeatability and linearity of sensor arrays are shown to depend on the processing history, the morphology of sensing films, and the geometry of sensor layout.

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