2. Nanocrystalline SnO₂ is synthesized in a partial sol-gel process. CuO dopant is synthesized through a precipitation process. The dopant and the sol-gel are mixed in proportions chosen to obtain the desired composition of the final product. One composition found to be suitable is a molar ratio of 1:8 CuO:SnO₂.
3. The dopant and sol-gel mixture is deposited in drops on (and across the gaps between) the electrodes.
4. The workpiece is heated at a temperature of 700°C, converting the dopant and sol-gel mixture to a film of nanocrystalline CuO-doped SnO₂.

In operation, a sensor of this type is heated to a temperature of 450°C while it is exposed to the CO₂ to be detected and the electrical resistance of the film between the electrodes is measured. Preliminary results of tests on a sensor containing a film of 1:8 CuO:SnO₂ showed an approximately linear response at CO₂ concentrations from 1 to 4 percent (see figure). In subsequent research and development efforts, it may be possible to increase sensitivities and/or reduce operating temperatures by combining CuO-doped SnO₂ with solid-electrolyte materials.

This work was done by Jennifer C. Xu and Gary W. Hunter of Glenn Research Center and Chung Chiun Liu and Benjamin J. Ward of Case Western Reserve University. Further information is contained in a TSP [see page 1].

Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Innovative Partnerships Office, Attn: Steve Fedor, Mail Stop 4–8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-18247-1.
The **WASP System** would include a gimbal that would aim several cameras operating in different spectral bands to acquire images at discrete angular increments to build a mosaic spectral image of a cross-track swath.

collected in at least three spectral bands (LWIR, MWIR, and SWIR at night or MWIR, SWIR, and visible or VNIR during the day), necessitating two registration steps. In the first step, the frames from the three spectral bands would be aligned into one frame. Then the frames from the four angular positions would be aligned to produce the mosaic. This work was done by Donald McKeown and Michael Richardson of Rochester Institute of Technology for Stennis Space Center. Inquiries concerning rights for its commercial use should be addressed to:

Rochester Institute of Technology
54 Lomb Memorial Drive
Rochester, NY 14623-5604
E-mail: mckeown@cis.rit.edu

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