

Abstract Submitted  
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**CO<sub>2</sub> Sensing and CO and H<sub>2</sub>O Interactions on Mats of Gold Nanoparticle Decorated GaN Nanowires.**<sup>1</sup> C.A. BERVEN, R. ABDELRAHAMAN, W. BARREDO, D.N. MCILROY, Dept. of Physics, University of Idaho — We report on the use of mats of gold-nanoparticle-decorated GaN nanowires for the detection of CO<sub>2</sub> and the possible generation of CO<sub>2</sub> and H<sub>2</sub> by interactions of CO and H<sub>2</sub>O on the surfaces of the gold nanoparticles. The sensor was constructed from a 10-20  $\mu\text{m}$  thick mat of GaN nanowires grown on a 1 cm diameter sapphire substrate followed decoration of the nanowires with gold nanoparticles. Selective wet etching was then used to reduce the amount of gold on the nanowires. Electrical measurements were made of the mat under various atmospheres. When exposed to just water vapor, CO or H<sub>2</sub> the current-voltage curves were similar to those when in vacuum. However, when the device was exposed to CO followed by H<sub>2</sub>O, we saw a significant reduction in the current at all values of applied voltage. Exposure to just CO<sub>2</sub> showed a similar response to that of mixing CO and H<sub>2</sub>O implying that CO<sub>2</sub> is being generated and that what is being sensed is the product of the reaction of CO + H<sub>2</sub>O creating CO<sub>2</sub>. As a consequence of CO<sub>2</sub> being detected after the mixing of CO and H<sub>2</sub>O, we speculate that H<sub>2</sub> is being generated giving a possible new mechanism for H<sub>2</sub> generation.

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