

# **A Novel Fabrication Technique for Nanowire Sensor Arrays for Gas Detection**

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A nanowire-based gas sensor array for in-situ chemical sensing including spacecraft safety monitoring, gas emission monitoring, air and water quality monitoring, and fire detection will be described. We describe the fabrication of metal (e.g. Pd, Fe) and metal oxide (e.g. In<sub>2</sub>O<sub>3</sub>, SnO<sub>2</sub>) nanowires by a cost-effective and high-yield aqueous electrodeposition method. Our nanowire-based gas sensor reduces power consumption at least by a factor of 10 by replacing the mesowire sensor array (100nW) with a single nanowire pixel for each sensing material. The innovative concepts of this work are the fabrication of single freestanding nanowires for sensing a gas, and the fabrication of a nanowire array with individually addressable sensors that has not been demonstrated previously. The nanowire-based gas sensor resulting from this research will consist of electrodeposited freestanding nanowires, sharp silicon nano-tips, and an integrated readout circuit.