

Abstract Submitted  
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**Integrating Different Types of Nanowire Sensors in a Large Array**<sup>1</sup> YAPING DAN, University of Pennsylvania, STEPHANE EVOY, University of Alberta, A.T. CHARLIE JOHNSON, University of Pennsylvania — Biological olfactory systems have a key structural feature: different types of sensors in a large array. Humans, for example, possess several hundred distinct types of sensing cells, a level of sensor diversity not yet achieved in artificial olfactory systems. Here, we demonstrate a simple and low-cost electrochemical approach to integrate large numbers of different types of nanowire sensors in an array on the same silicon wafer. In our approach, nanowires are grown inside an on-chip nanochannel template by electrochemistry with each horizontal channel connected to a gold electrode. This design allows for addressable synthesis of a specific type of nanowire in specified channels by providing a voltage to the electrodes connecting to those channels. The process can be further repeated to produce different types of nanowires in other channels using different electroplating solutions. The scale and diversity of this array have a potential to compete with those of biological olfactory systems and the synthesis process is cost-effective enough for commercialization.

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