

The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)  
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## Organic Field Effect Transistors for High-Sensitivity Bio/Chem Detection System

A high-speed bio/chem sensor using organic material structures attached to a modified semiconductor or dielectric surface can be manufactured. In this device, an organic field effect transistor, a conjugated arylene-vinylene organic layer-constitutes the active semiconducting material. The “open” side functions as an electronic “nose” by using particular receptor/ligand functional groups with specific key/lock functionalities to provide specific sensitivity toward a targeted analyte. The event of an analyte binding to the receptor will be read out as a change in charge transported across the organic layer.

### Applications

- Specific Sensing Applications
- Biohazards Detection
- Complex Analytical Matrices

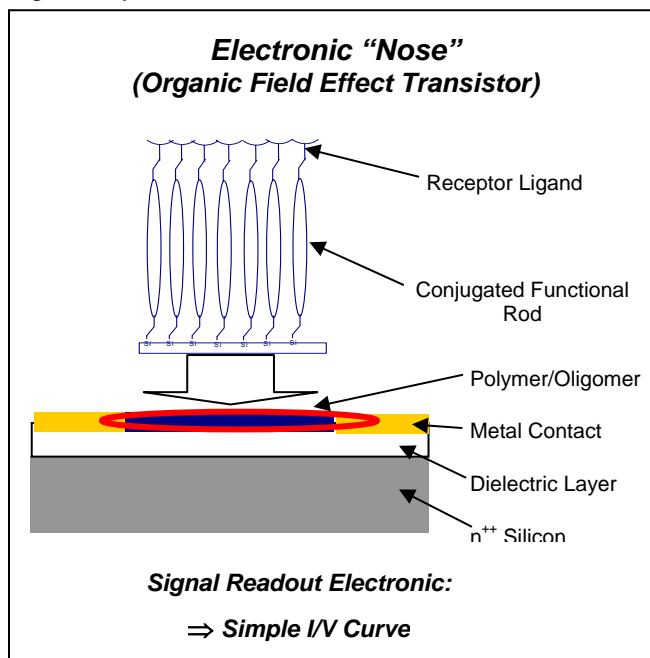
### Benefits

- Platform Technology
- High Sensitivity and Specificity
- Versatility (easily adaptable to different agents)
- Pixelated Array possible

### The Technology

The conjugated organic systems with specific key/lock functionalities are semiconducting materials that may be doped to effect p/n conductivity. The approach involves the self-assembly into a highly ordered supramolecular aggregate. If one single molecule is affected by the event of an analyte binding to its receptor/ligand function, it will strongly influence the electronic function (i.e., conductivity) of the entire aggregate, thus dramatically changing the electric output of the device. The sensitivity can also be easily controlled with an externally applied gate voltage.

The fabrication techniques for the organic layers with specific analyte related key/lock receptor-ligands are versatile and should allow for a wide variety of highly specific sensors. In addition, it is conceivable that a platform technology approach could be used in the manufacturing process of the device, in which one of the last steps consists in “flavoring” the sensor according to the specific application.



This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

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