**Detecting Danger at Nanoscale**

**Organic Nanowires for Trace Vapor Sensing of Explosives and Other Threatening Chemicals**

**Optical and Electrical Sensing**

- **Enhanced sensitivity**
- **1D self-assembly through molecular π–π stacking**

**Ideal sensor for vapor detection**

- **Long-range exciton migration enables amplification of fluorescence quenching**
- **Electron delocalization leads to a sensor for reducing reagents**
- **Materials covering both n-type and p-type**:  
  - **n-type**: electron accepting → sensing for reductive (e-donating) molecules, e.g., amines.
  - **p-type**: electron donating → sensing for oxidative (e-accepting) molecules, e.g., nitro-aromatics.

**Ultrathin nanowires for increased surface area and more confined exciton diffusion and charge transport**

**Efficient fluorescence sensing of explosives vapor**

**Selectivity against ambient interference**

**High stability for repeated use**

**Quenching efficiency independent on film thickness**

**Quenching (%)**

- **Enhanced sensitivity**

- **1E-3 0.01 0.1 1 10 100 1000**

**Vapor concentration (ppb)**

- **5 ppt 0.1 ppb 1 ppb**

**Efficient fluorescence sensing of amines vapor**

**Potential interference from Cosmetics (10 s exposed to sat. vapor)**

**Detection limit down to few ppt**

**Freshly deposited nanobelt**

**Broken after high current**

**Electrical sensing of hydrazine vapor**

**Quenching efficiency (1-I/Io)**

- **Accounts of Chemical Research, 41 (2008) 1596-1608.**

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