Call for
Expression of Interest
For Flexible Gas Sensors

23rd August 2015
Technology Development for Flexible Gas Sensors

- Indoor air quality
- Early disease detection
- Food packaging: Spoilage
- Safety/Environmental applications

Ref: Google images
1. Indoor air quality

Various gases that affect human health need to be detected

2. Early disease detection

Gases in breath can be indicators of disease

Background (contd)

3. Food Packaging: Spoilage

**Importance of Gases in Food/Ag**

- **Ethylene:**
  - Given off by produce during ripening (15+ climacteric fruits, e.g., avocado, banana, apple, mango)
  - Induces ripening (35+ fruits, vegetables, and flowers respond to ethylene)
  - Indicator of plant health (can be combined with measurement of other gases)

- **Amines:**
  - Indicator of meat/fish spoilage
  - Soil nutrient level monitoring

**Google images**

Indication of food spoilage by detection of characteristic emitted gases

Hazardous and Pollutant Gases need to be detected

4. Safety/Environmental Applications

**Conventional Air Pollutants**

- 221100 Power generation and supply
- 326110 Petrochemical manufacturing
- 525120 Synthetic dye and pigment manufacturing
- 524110 Petroleum refineries
- 211100 Oil and gas extraction
- 525110 Other basic inorganic chemical manufacturing
- 525120 Adhesive manufacturing
- 218112 Support activities for oil and gas operations
- 325100 Other miscellaneous chemical product manufacturing
- 448400 Truck transportation

EOI-4: Flexible Gas Sensors
Market Size and Potential

Printed sensors in 2020: relative market size

Printed sensors CAGR 2015-2025

EOI-4: Flexible Gas Sensors
Current Available Options

- Metal oxide based sensor
  - Operating temperature: $>$ 300 °C
  - Cost: $>$ INR 6000/-

- Several platforms
  - Alcohol detection
  - Cost: $>$ INR 10000/-

Indoor air quality management system

Early disease detection

- Not yet commercialized
  - Development of wireless ethanol sensing tag for food packaging

Food packaging:
Degradation status of food

- Metal oxide based sensor
  - Operating temperature: $>$ 300 °C
  - Cost: $>$ INR 6000/-

Safety application:
Industrial pollution

Some of the representative but not exhaustive options

EOI-4: Flexible Gas Sensors
Proposed Approach

1. Functional sensing materials
2. Tunable selectivity and high sensitivity
3. Sensor array – multianalyte detection
4. Flexible platform
5. Communications protocols – application specific
Advantages of proposed solution

- Performance
- Form factors
- Lower cost
- Integration

EOI-4: Flexible Gas Sensors
Call for Partners

- Our centre is developing gas sensors for various applications
- We are seeking partners across the value chain shown above
- We are looking for partners to enable the scaling and manufacturability of the developed processes
- Preferential terms for early partners
Contact Information

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Also visit our webpage for more details on partnership models and other technology domains: [www.ncflexe.in](http://www.ncflexe.in)