Polydiacetylene Nanofibers for Colorimetric and Amperometric Sensors

Technology #5435

Moisture sensors have a wide variety of applications in various environments. In industrial settings, moisture control is important in manufacturing and storage facilities, detection of pipe leaks or broken seals in controlled devices, prevention of mold growth, and monitoring of soil water content. While most moisture sensors are based on electrical conductance, there is a desirable need for visually determining the presence of water in the form of vapor or liquid as a lower-cost and simpler strategy. Such a method would allow for further applications of such water indicators in the health care field, such as evaluation of wound sites in preparation for surgery and use in humid environments (i.e. oral cavity) for detection of liquid water in tissue.

Polydiacetylene Water Sensors

Polydiacetylenes (PDAs) are self-organizing polymers that respond to external stimuli such as temperature, pH, and mechanical stress, resulting in a color change from blue to red. Nanofibers based on diacetylene monomers can be polymerized to form a dried film as a coating on a substrate. The incorporation of a moisture-sensitive polymer further allows for visual detection of water, in addition to a colorimetric change that occurs in the presence of moisture. The developed technology allows for its application in the form of a film or other physical forms, such as probes.

Applications

- Moisture control in industrial and health care settings

Advantages

- Simple, reliable method of detecting water using color change
- Moisture-sensitive materials can be applied as a film on a substrate
- Can be provided in various physical forms (i.e. probes)
- Sensor can be optimized for use in humid environment (i.e. respond to liquid water only)
- Does not require electricity or power supply

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