

What is a small molecule temperature-sensitive fluorescent probe?

Most of the small molecule temperature-sensitive fluorescent probes are derived from rhodamine, BODIPY, or molecules emitting from a twisted ICT state, whose emission intensity and/or lifetime are temperature dependent and where the sensors operate typically over a narrow temperature range from around 20 °C to 70 °C [33,39,40].

Can organic crystals be used as fluorescence-based thermal sensors?

A mechanically compliant and robust sensing material is essential for accurate and reliable thermal sensing. Here, the authors report the use of elastic organic crystals as fluorescence-based thermal sensors that cover a wide range of temperatures with complete retention of the sensor's elasticity.

Can fluorescence be used to measure optical temperature?

Specifically, crystals of the organic crystalline material that we describe display reversible, reproducible, and strong temperature-induced shifts of their fluorescence, which translates into an opportunity for reproducible optical temperature measurement based on fluorescence.

Can temperature sensors operate over extended temperature ranges?

Nature Communications 13, Article number: 5280 (2022) Cite this article Operation of temperature sensors over extended temperature ranges, and particularly in extreme conditions, poses challenges with both the mechanical integrity of the sensing material and the operational range of the sensor.

Can organic fluorophores be used for temperature sensing?

Optical temperature sensing using organic fluorophores has been developed over the past two decades, there are now examples of organic temperature sensors that show high sensitivity, fast response, simple operation, and have been used in diverse applications such as bioimaging [33], fluorescent thermometers [34], and microfluidics [35].

Can TADF materials be used as temperature sensors?

Organic TADF materials have also shown promise as temperature sensors [41,42]. However, most TADF-based temperature sensors rely only on changes in the emission lifetimes or emission intensity of the materials, which are governed by the endothermic nature of the RISC processes.

A flexible fluorescent fiber temperature sensor doped with upconversion fluorescent nanoparticles based on fluorescence intensity ratio (FIR) technology is proposed to improve the stability and ...

The double-filled PAN composite fibers also had a good energy storage density, reaching an energy storage density of 44.02 mJ/cm<sup>3</sup> under the action of an electric field of 420 kV/cm<sup>3</sup>, which was 1.64 times of ...

In this paper, we present a novel optical fiber fluorescent temperature sensor based on photonic crystal fiber(PCF) and its theory of forward stimulated fluorescence emission in PCF. It is ...

Multifunctional Thermally Activated Delayed Fluorescence Carbon Dots for Temperature-Responsive Sensor, Information Encryption, and Organelle Imaging. Hao Li, Corresponding Author. ... Thermally activated ...

Aiming at the problem of long-term dependence on rare-earth (RE) ions and insufficient stability of a fluorescent optical fiber temperature sensor, a fluorescence intensity ratio (FIR) temperature ...

2.1 Fluorescence decay temperature sensor In fluorescence decay technology, a fluorescent ... the energy gap as opposed to temperature, as a simple calculation could demonstrate. For ...

Thermally activated delay fluorescence (TADF) has great potential for information encryption, temperature detection, and bioimaging due to its long-lived luminescence, temperature-sensitive and high signal-to-noise ratio.

Accurate temperature control within biological and chemical reaction samples and instrument calibration are essential to the diagnostic, pharmaceutical and chemical industries. ...

The heat of the energy storage cabinet is influenced by some factors, such as the ambient temperature and the temperature crosstalk between multiple air ducts, which can ...

This paper puts forward a kind of optical fiber temperature sensor based on fluorescence lifetime, which can be applied to measurement in strong electromagnetic, strong ...

Glass ceramics (GCs) containing PbS quantum dots (QDs) are prepared for temperature sensing. Broadband emissions are detected in the GCs when PbS QDs are precipitated from the glasses, and emissions centers are ...

Herein, a point all-fiber temperature sensor based on the FIR technique has been developed. Er<sup>3+</sup>/Yb<sup>3+</sup> co-doped NaYF<sub>4</sub> phosphors (NPs) were used to fabricate a temperature sensing probe combined with silica fiber. Highly ...

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