Indoor capacitor smoke detection

How does a capacitive detector cell detect smoke particles?
The detection of smoke particles is obtained by detecting the change in electrical signals caused by changes in capacitance. The capacitive detector cell is designed with a micro-nano structure,making it sensitive enough to detect smoke particles at PPM-level concentrations. The size of the capacitive detection cell is 45 mm.

Can a capacitive smoke sensor detect smoldering smoke?
A capacitive smoke sensor based on MEMS technology can detect smokegenerated by hydrogen-containing substances during the smoldering stage. But,it is not sensitive to smoke particles by combustion of carbon-containing substances 11. However,this approach also affects the sensitivity of the detector to a certain extent.

What is a smoke particle analysis detector & multiscale smoke particle concentration detection algorithm?
The newly designed capacitive particle analysis detectorand multiscale smoke particle concentration detection algorithm can perform high-precision detection of smoke particles at various concentrations. 3. Even when there is interference from oil,gas,or dust particles,the detector can still accurately detect at a higher level than the PPM.

How accurate is a smoke detector?
Through experiments,it is found that the detector provides effective detection of smoke particle concentrations ranging from 0 to 10% obs/m; moreover,the detector can detect smoke particles at parts per million (PPM) concentration levels (at 2 and 5 PPM),and the accuracy of the detector can reach at least the 0.5 PPM level.

Can a capacitive smoke sensor detect hydrogen smoldering?
A capacitive smoke sensor based on MEMS technology can detectsmoke generated by hydrogen-containing substances during the smoldering stage. However,it is not sensitive to carbon-containing substances and still cannot distinguish the type of smoke particle [10].

What is the diameter of smoke particles based on capacitive detection element cells?
The diameter of smoke particles usually ranges from 0.1 to 100 mm. In this study,a structure for analyzing and detecting smoke particles based on capacitive detection element cells is designed,and particles of different sizes will form mixed signals with different amplitudes and frequencies when they pass through the detection structure.

Although smoking in enclosed spaces is banned across many U.S. states, many owners of private properties continue to face issues with smoking in prohibited areas om the health risks associated with secondhand smoke to issues regarding unpleasant odors, fire safety and visible property damage, indoor smoking presents significant challenges for property owners.

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Indoor fires can easily cause property damage and especially serious casualties. Early and timely fire detection helps firefighters make scientific judgments on the cause of fires, thereby ...

The newly designed capacitive particle analysis detector and multiscale smoke particle concentration detection algorithm can perform high-precision detection of smoke ...

The invention relates to a smoke fire detector, in particular to a capacitive smoke fire detector, and solves the problem that the existing fire detector has complex application background and is effected by different interference sources; the invention comprises a shell and a capacitor, wherein, the capacitor comprises 3 to 20 layers of capacitance plates and two electrode rods; ...

Through experiments, it was found that the detector provides effective detection of smoke particle concentrations ranging from 0 to 10% obs/m; moreover, when the detection ...

The smoke detector capacitor 402 is coupled to the capacitance measurement circuit 404 or the capacitance change detection circuit 106 having a capacitance measurement circuit 404 incorporated therein. The digital processor 406 may further be coupled to temperature and/or humidity sensors 432 and 434, ...

Design of a Home Fire Detection System Using Arduino and SMS Gateway. November 2021; Knowledge 1(1):61-74; ... the MQ2 sensor, which is used to identify ...

Product 2: 2-in-1 hazard detection - The combined smoke and CO detector senses dangerous levels, so you cut down the number of sensors you need to keep your family safe. Product 2: Ignores burning food - This detector is engineered to tell the difference between dangerous smoke and burning food, so it can tell when it"s an actual emergency.

The evaluation metrics used by reported research for the detection of smoke and fire include TPR where TPR is the rate of correctly recognizing real fire/smoke as a fire/smoke, True Negative Rate (TNR) is the rate that in which non-fire/non-smoke objects are not detected as fire/smoke, False Positive Rate (FPR) also known as false alarm rate represents the rate of recognizing non ...

The protection device comprises at least one smoke sensor, a controller and a conversion module, wherein the at least one smoke sensor is arranged above the indoor capacitor group, ...

Based on the detection and recognition tests using indoor fire and smoke videos, results indicated that the fire detection achieved up to 92.37% correct detections while the smoke detection did ...

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