



Particle Morphology Measurement (20100247)

IP Status: Issued US Patent; **Application #:** 13/779,308

Particle Filter for Nanoparticles with Different Shapes

Filtration techniques used in a new filter sensor can differentiate particles with different shapes. Using a combination of a differential mobility analyzer (DMA) with a uniform pore filter, nanoparticles with various mass-mobility fractal dimensions (D_{fm}) can be differentiated. The sensor is also able to measure mass mobility as well as the effective length (or maximum projected length) of nanoparticles with different shapes. After monosized particles pass through a Nuclepore filter, particle penetration (the ratio of particle concentration downstream of the filter vs upstream) is measured and morphological parameters, based on the fraction of particles of a class penetrating the filter, can be determined. Experimental data showed that more elongated particles resulted in lower penetration due to enhanced interception, and that adjusting the pore diameter, solidity and thickness of the filter may increase the sensor's sensitivity.

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Technology ID

20100247

Category

Engineering & Physical
Sciences/Instrumentation,
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Engineering & Physical
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Faster Aerosol Particle Characterization

Characterization of aerosols and aerosol particles is important in environmental and natural science, technology and medicine. This new filter sensor can measure the effective length and mass mobility fractal dimension in near real-time, yielding results in only a few minutes. The fast, cost effective sensor may be used as a research tool for toxicity, workplace pollution, meteorology, emission control and quality control of nanopowder manufacturing or other nanomaterial productions.

BENEFITS AND FEATURES:

- Differentiates particles with different morphologies
- Near real-time measurements; results within minutes
- Measures mass-mobility fractal dimensions (Dfm) as well as the effective length of different shapes of nanoparticles
- Adjustments to the filter may increase sensitivity

POTENTIAL APPLICATIONS:

- Nanotoxicity studies
- Quality control
- Emission control

Phase of Development Prototype dev

Researchers

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