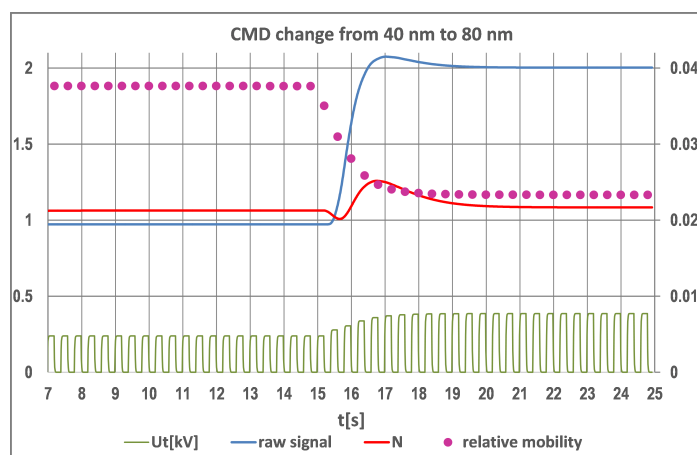


Fast PN-PTI sensor based on electrical detection and real-time particle size estimationE. Saukko¹, K. Janka¹¹Pegasor Oy, Tampere, Finland

Single channel electrical aerosol measurement instruments used for particle number measurement generally compromise between fast response time and accurate concentration response over a range of particle sizes. The response is typically sensitive to particle size and distribution shape. The size dependency disadvantage is solved by stepping the trap voltage optimally to estimate mean particle size, which is used to compensate for particle size dependency of the concentration measurement[1]. Using the stepping method, however increases the time response and is not suitable for fast transients, such as in automotive emissions.

An advanced measurement scheme has been developed to simultaneously achieve real time size dependency compensation and fast concentration response. The new sensor and measurement method achieves and surpasses number concentration accuracy, repeatability and linearity required for approval and inspection applications. The electrical measurement with a single channel construction is simple and robust and can be used in applications with harsh conditions. The lower particle size cut response function shape can be adjusted to match different application requirements.

The system has been tested with reference aerosols as well as engine exhaust. The concentration measurement time response is $\sim 0.2s$, while particle number size response is measured in seconds. The particle size range for the number concentration measurement can be down to 10nm and up to 300nm.



[1] Kauko Janka, Erkkä Saukko, US PAT 10760997