Light scattering technique for measuring air pollutant particle concentration

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Abstrak

In this research a scattering technique employing f or war dscatter of a He-Ne C0,5328 pm, 30 mw) laser beam together with a 1024 x 1024 arrays CCD-V11 video camera as a detector was used for determining both particle size distribution and concentration. For determining the size distribution the "Differential Fourier Transform Technique" is chosen because it does not require matrix inversion or a priori knowledge of functional forms of size and it takes advantage of the Fast Fourier Transform.

Measurements have been performed using this technique on cigarette smoke and smoke coming out, from burning clothes. From the experimental results it is shown that the diameter of cigarette smoke particles is between 0.3 and 1 . 3 pm. similar to that from a previous research C0.O4 - 1.00 pm). The measured size of smoke particles from burning clothes is 0.5 - 1.5 pm. similar to standard data Cabout 1 pm). But the obtained size distribution curves are still rough because of the limited observation scattering angle. It is also shown that the minimum and maximum concentration which can be detected are 1.8 x 107 particles/mma Cor 12.8 ppm) and 12.7 x 100 particles/=O Cor 906 ppm). This means that this technique can be used for measuring air pollutant concentration, as especially from smoke.