

Analysis on Micro dust Removal Driven By

Electrostatic Spray in Exhaust gas

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1. Introduction – Increased air pollution due to dust particulates brought about a need for more effective measures to reduce dust particles from the exhaust gas of coal-fired power plants. The electrospray is one of the most well-known spray techniques using highly concentrated free charges from high intensity electrical potential between two oppositely charged electrodes to produce very fine and highly charged water droplets in a conical shape

2. Experimental - We investigate and establish the flow motion and water droplet size variation for various operating conditions such as flowrate, velocity, applied voltage, nozzle size, and electrode distance. From experimental works, we propose the most sensitive factors influencing the flow motion, aiming at its application to the various industries such as coatings, pharmaceuticals, or post-combustion flue gas treatment. In particular, we focused on its application to the ultrafine particles collection. The highly charged droplets induced by the electrospray method impact fine particles inside a flue gas, stick to the collector body, and then the waste water finally falls through the collector surface.

3. Results and Discussion - Experimental results show that the most optimized spraying condition to collect PM1.0 were 10 ccm in flowrate, 45 kV in voltage and 75 mm in electrode distance when using the nozzle size of 0.5 mm. Removal Efficiency of PM10, PM2.5 and PM1.0 was measured as 88, 93, and 94%, respectively, when operated in the order of dry cyclone EP-electrostatic spray cube dust collector. When operated in the order of electrostatic spray cyclone-electrostatic spray cube dust collector, 97, 97, and 99%, respectively.

4. Conclusions – In this study, The electrostatic spray technique in a wet electrostatic precipitator was verified for the possible range of the applied voltage and the flow rate for use. It is necessary to study the specific range in consideration of the inside of the dust collector in which the operation is required at the minimum voltage and corona.

5. References

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