

CAPTURE OF COAL-FIRED FLY ASH AND CARBON BLACK BY WET ELECTRO-SCRUBBING

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We investigated the adaptability of wet electro-scrubbing on removal of coal-fired fly ash and carbon black in a mini-pilot scale. The micro-droplets used in experiments were generated by a twin-fluid nozzle and charged by the mode of induction charging. The electric low-pressure impactor, scanning electron microscope and energy-dispersive X-ray spectroscopy were used to measure the number concentration, morphology and trace-elements before and after wet electrostatic scrubber. The results showed that the collection efficiencies of both fly ash and carbon black increase with an increase of induction voltage and have a nonmonotonic trend with increasing spray flowrate. The differences of wettability, conductivity and morphology between fly ash and carbon black lead to a diverse collection of efficiencies. Compared with the inlet of scrubber, the morphology of fly ash out of the scrubber showed different degrees of agglomeration while that of carbon black has no significant transformation. The collection efficiency of trace elements within fly ash PM10 was less than that of the PM10 itself. In conclusion, the wet electro-scrubbing is a promising technology that can improve significantly the removal efficiency of both fly ash and carbon black.