<<第11届国际电除尘学术会议论文集-E>>

图书基本信息

书名：<<第11届国际电除尘学术会议论文集-Electrostatic Precipitation>>

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内容概要

Electrostatic Precipitation includes selected papers presented at the 11th International Conference on Electrostatic Precipitation. It presents the newest developments in electrostatic precipitation, flue gas desulphurization (FGD), selective catalytic reduction (SCR), and non-thermal plasma techniques for multi-pollutants emission control. Almost all outstanding scientists and engineers world-wide in the field will report their on-going researches. The book will be a useful reference for scientists and engineers to keep abreast of the latest developments in environmental science and engineering.

书籍目录

World-Wide Review　Development of Chinese Electrostatic Precipitator Technology　Multi-pollutants Simultaneous Removals from Flue Gas　Some Technical Idea Evolutions Concerned with Electrostatic Precipitators in China　Enhancement of Collection Efficiencies of Electrostatic Precipitators: Indian ExperimentsFundamentals and Mechanical Design　Modeling Mercury Capture within ESPs：Continuing Development and Validation　Reduction of Rapping Losses to Improve ESP Performance　Advanced Risk Ana1ysis for the Application of ESP-s to Clean Flammable Gas-pollutant Mixtures　ESP for Small Scale Wood Combustion　Dust flow Separator Type Electrostatic Precipitator for a Particulate Mattel Emission Control from Natural Gas Combustion　Electrostatic Precipitator：The Next Generation　Current Density and Efficiency of a Novel lab ESP for Fine particles Collection　Five Stages Electrostatic Precipitator Principles and Application　Application of STAAD in ESP structure design　E1ectric Resistance of Boiler Flue Gases and Collection Efficiency of ESP　Non-static Collection Process of the Electrostatic Precipitator　Study of Using Mixed Discharge Electrodes and Mixed Spicing of Pole to Pole for Electrostatic Precipitator　Experimental Investigation on the Collection of Fine Dust with High Resistivity by a Bipolar Discharging ESP　Designing ESP Systemically to Reduce Dust Emission　Research on Vibration Period Optimization of Electrostatic Precipitator　Study on the Dust Removal Efficiency Formula of EP with Efficiency Enhancing and Energy-saving　Research and Application of the Extensive Resistivity and Efficient Electrostatic Precipitator　Application and Research on Technology of Longking Brand BEL Model ESP　Electrode Shape and collector plate Spacing Effeets on ESP Performance　Resistance and Airflow Distribution of Rotary Plate　Onset Voltage of Corona in Electrostatic Filters as Influenced by Gas Flow　An Initial Exploration for Coulomb ESPAerodynamic Effectsand ESP Models　Effect of the EHD Flow on Particle Surface Charging and the Collection Efficiency of Submicron and Ultrafine dust Particles in Wire-plate Type Electrostatic Precipitators　Electrohydrodymanic Turbulent Flow in a Hybrid Particulate Collector　CFD Simulation of Electrostatic Presipitators and Fabric Filters State of the Art and Applications　Numerical Modeling of the Electro-hydrodynamics in a Hybrid Particulate Collector　CFD Numerical Simulation of ESP Airflow Distribution and Application of Flue Gas Distribution　Study and Application of Numerical Calculation Method for Gas Flow Distribution of Large Scale Electrostatic Precipitator　Experimental Study on Optimization of Electric Field Performance for Electrostatic Precipitator by Using Finite Element Method　Analytical study on ZT Collecting Electrode Model EEⅠTechnology in 1#125 MW Unit of Electrostatic Precipitator Application for GUODIAN Kaili Power Plant Model EEⅡTechnology in 2#600 MW Unit of Electrostatic Precipitator Application for GUODIAN Kaili Power Plant Numerical Simulation of Influence of Baffler in Electric Field Entrance to Form Skewed Gas Flow A numerical Simulation for Predicting Influence of Flow Pattern in Electrostatic Precipitator on Exit Re-entrainment LossFine-Particles and Their Agglimeration Research Progress of the Control Technology of the PMf from Combustion Sources Enhanced Fine Particle and Mercury Emission Control Using the Indigo Agglomerator Emission Reductions at a Chinese Power Station On-line Measurement of Hazardous Fine Particles for the Future APC Technology A Novel Method for Particle Sampling and Size-classified Electrical Charge Measurement at Power Plant Environment Agglomeration Modelling of Sub-micron Particle During Coal Combustion Based on the Flocculation Theory Integrated Control of Submicron Particles and Toxic Trace Elements by ESPs Combined with Chemical Agglomeration　……
Electrical Operation and Power SourcesFlue Gas Conditioning and Back CoronaUpgrading of Existing Electrostatic PrecipitatorHybrid ESP& FF PrecipitationWet Electrostatic PrecipitationIndustrial Applications for Coal-fired BoilersIndustrial Applications for Steel IndustriesFGD and SCR for Coal-fired Power PlantsNon-Thermal PlasmasApplied Electrostatice

章节摘录

Cp is the time-dependent gas-phase concentration of mercuryadjacent to the particle surface, which is assumed to be inequilibrium with the solid-phase mercury concentration at theparticle surface, Although fly ash is known to have varying adsorptioncapacities for mercury [13, 14], for simplicity, the presentalgorithm does not address fly ash adsorption of gas-phasemercury. The comparisons between the present algorithm andfull-scale ACI results are limited to the additional mercurycapture observed to occur across an ESP during ACI. Ourprevious analysis [8] concluded that even under idealizedconditions, wall boundary mass transfer of gas-phase mercuryto the ESP plate electrodes is slow, contributing a relativelysmall portion of the total mercury removal within typicallysized ESPs;the dilution of the powdered sorbent on the ESPplate electrodes by the much larger（~O（102））amounts of flyash further diminishes the contribution of this removalmechanism. The model, as described previously [8-12], employs thefollowing assumptions:l.No mercury adsorption by native fly ash;2.No mercury adsorption by internal ESP surfaces:3. Powdered sorbent is uniformly distributed throughout flue gas at ESP inlet:4. Powdered sorbent mass concentration （g/m3） varies only in the streamwise direction within the ESP;5. All particles attain their theoretical maximum particlecharge;6.Fixed value of electric f'ield voltage（54kV）The algorithm also employs additional assumptionsregarding particle dielectric constant （very large）, particlesphericity（perfect）, flue gas pressure（atmospheric）andthermodynamic properties （ideal）and particle losses due toagglomeration, and rapping reentrainment and sneakage forthe ESP （neglected）.For all model results, the algorithm usessorbent physical properties equaJ to those of NORIT Hgpowdered activated carbon （PAC）, primarily because of themany full-scale tests in which it has been used. In addition, and unlike other sorbent manufacturers, NORIT has made thedetailed particle size distribution for tFus product readilyavailable, which we have shown previously [10] has a stronginfluence on in-flight mercury capture. Fig. 1 shows themeasured particle size distribution of the NORIT Hg PACand the two curve fits（above and below 35 um）used torepresent it in the model. Because flue gas composition isknown t, o affect the rate and capacity of any sorbent to adsorbmercury, a lumped capacitance-mass transfer model of in-flight mercury capture would require some measure of the mercury adsorption capacity of a given sorbent at a particularsite. Several of' the early full scale tests reported fixed bedequilibrium adsorption capacity for the NORIT PAC;however, subsequent full-scale tests eliminated this measure, for reasons and with implications that will be discussed. In theabsence of site-specific mercury adsorption capacity measure-ments for the NORIT Hg sorbent, estimates are used for the equilibrium adsoiption capacity based on coal rank, an approachwhose results and implications also will be discussed. A collection of eleven full-scale tests of sorbent injectioninto cold-side ESPs using NORIT Hg sorbent constitute thefield data against which the model results are compared: SixDOE-NETL-sponsored tests （Monroe 4, Leland Olds, MiamiFort 6, Brayton, Pleasant Prairie（PPPP）, Meramec 2）and fiveproprietary, privately funded tests referred to here as Plants Athrough E. Table 1 presents a number of key parameters fromeach test program at each site. For DOE-NETL tests, many ofthe parameters can be found in the quarterly and final reportsassociated with each test program. In some instances, missingparameters were deduced from the available information（e.g., obtaining mean flue gas velocity from ESP geometry anddesign ESP specific collection area, SCA）or gleaned fromdiagrams and blueprints requested from the site operators.3 RESULTS

Figs. 3 to 5 present comparisons between the model results and the full scale ACI results at the eleven sites. Of the eleven full-scale ACI results, two-those from Brayton and Pleasant Prairie-provide on-site measurements of equilibriummercury adsorption capacity of the NORIT Hg powderedactivated carbon, using a fixed sorbent bed applied to a slipstream of the local flue gas. The present, model requires as input a value for the equilibrium adsorption capacity of thesorbent, which determines the rate at which each sorbentparticle approaches saturation during mercury adsorption, which in turn determines the rate at which the gas-phasemercury concentration at the particle surface（Cp（t））approaches the far-f'ield value（cv（tD（see Eq. 1）.In theabsence of measured, site-specific equilibrium mercury adsorption capacity at the other nine sites, a rough assumptionwas made that sites burning similar coals would exhibitsimilar equilibrium mercury adsorption capacities for thesame sorbent.

Although mercury adsorption kinet, ics are clearly much more complex than this assumption implies, it permits validation of the model against rune sites rather than two, and in its imprecision provides an opportunity to assess the degree to which each site's performance deviates from the ideal, mass-transfer-limited result. ……