

Supporting Information

Non-Negligible Stack Emissions of Noncriteria Air Pollutants from Coal-Fired Power Plants in China: Condensable Particulate Matter and Sulfur Trioxide

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Equations

All the associated quantitative formulas of mass concentrations, removal efficiencies, and 6% oxygen content conversion are shown as follows:

$$C_{SO_3} = \frac{c \times V \times M_{SO_3}}{Q \times M_{SO_4^{2-}}} \quad \text{Eq. S1}$$

where C_{SO_3} is the mass concentration of SO_3 , mg/m³; c is the tested concentration of SO_4^{2-} , mg/L; V is the sample volume, L; Q is the total volume of sampled flue gas, m³; M_{SO_3} and $M_{SO_4^{2-}}$ are the molecular weights of SO_3 and SO_4^{2-} , respectively.

$$\eta_{i,j} = \frac{C_{i,j,in} - C_{i,j,out}}{C_{i,j,in}} \quad \text{Eq. S2}$$

where $\eta_{i,j}$ is the removal efficiency of facilities j for pollutants i ; $C_{i,j,in}$ and $C_{i,j,out}$ represent the concentrations of pollutants i at the inlet and outlet of facilities j .

$$C_i = C'_i \frac{21 - O_2}{21 - O'_2} \quad \text{Eq. S3}$$

where C_i is the mass concentration of pollutants i based on 6% O_2 , mg/Nm³; C'_i is mass concentrations of pollutants i based on field tests, mg/m³; O_2 is the unity oxygen content, %; O'_2 is the oxygen content in flue gas based on field test, %.

Table S1. Information for the tested CFPPs and ash (A_{ar})/sulfur ($S_{t,ar}$) contents in feed coal

CFPPs No.	boiler type	steam flow rate (t/h)	coal	A_{ar} (%)	$S_{t,ar}$ (%)	APCDs
#1	PC	200		23.18 ± 3.18	0.76 ± 0.13	SCR + ESP&FF + WFGD ^a
#2	PC	410	bituminous	26.15 ± 2.99	0.66 ± 0.16	SCR + FF + WFGD ^a
#3	CFB	260	coal	24.92 ± 6.05	0.83 ± 0.44	SNCR + FF + WFGD ^b &WESP
#4	PC	2209		28.95 ± 0.67	1.46 ± 0.06	SCR + ESP + WFGD ^b &WESP

Note: ^a, ammonia-based WFGD; ^b, limestone-based WFGD.

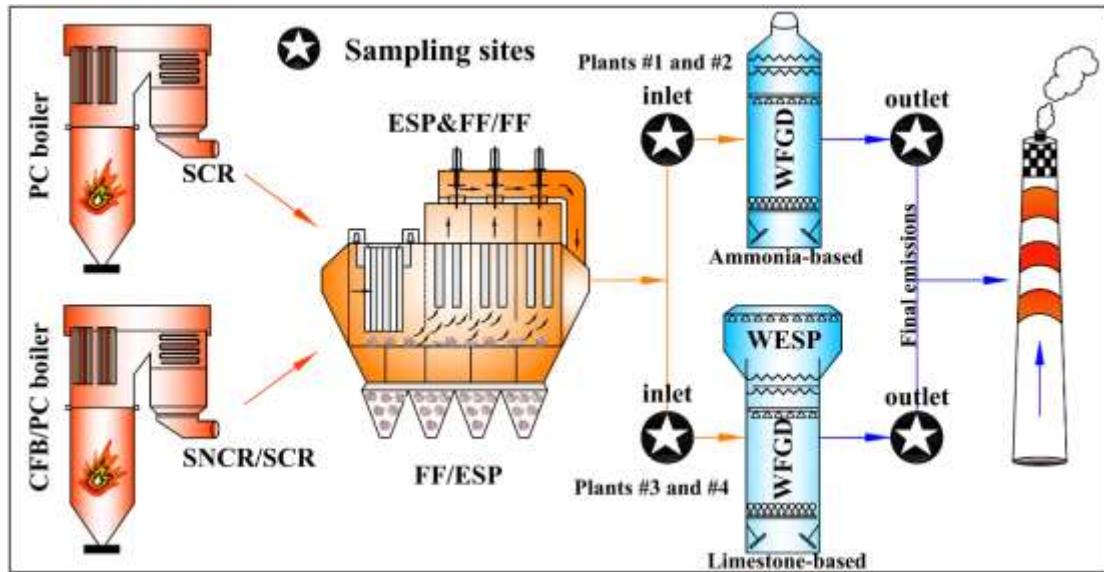


Figure S1. The schematic configuration of tested CFPPs and sampling sites

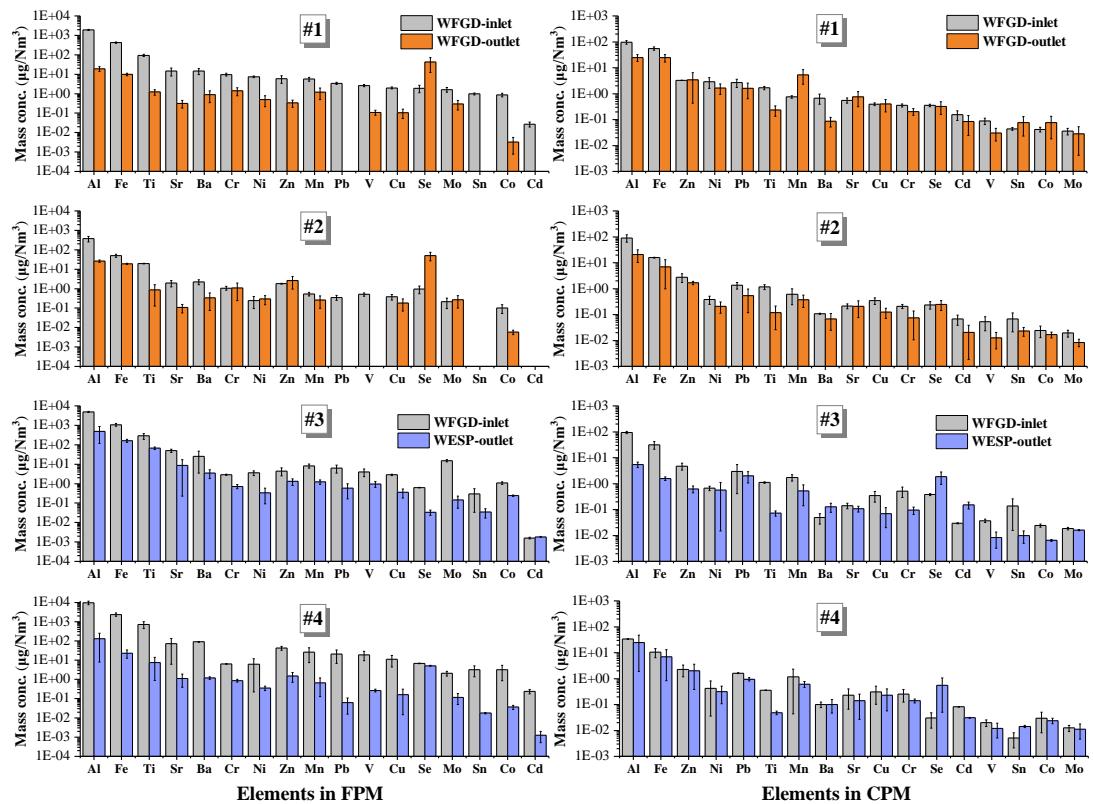


Figure S2. Mass concentrations ($\mu\text{g}/\text{Nm}^3$) of elemental species in FPM and CPM at the tested sites

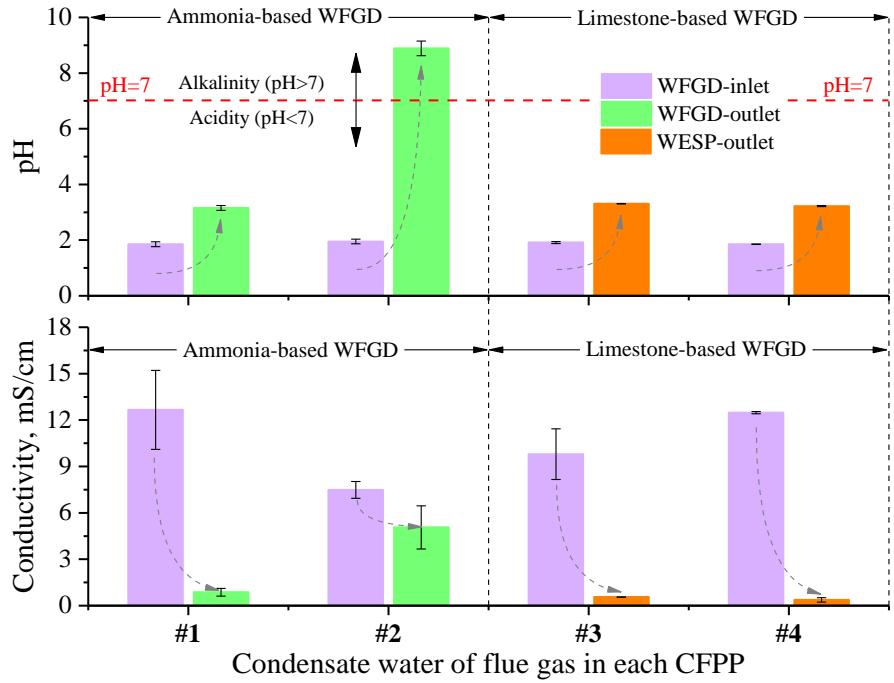


Figure S3. The pH and conductivity (mS/cm) of condensate water in flue gas for each tested CFPP

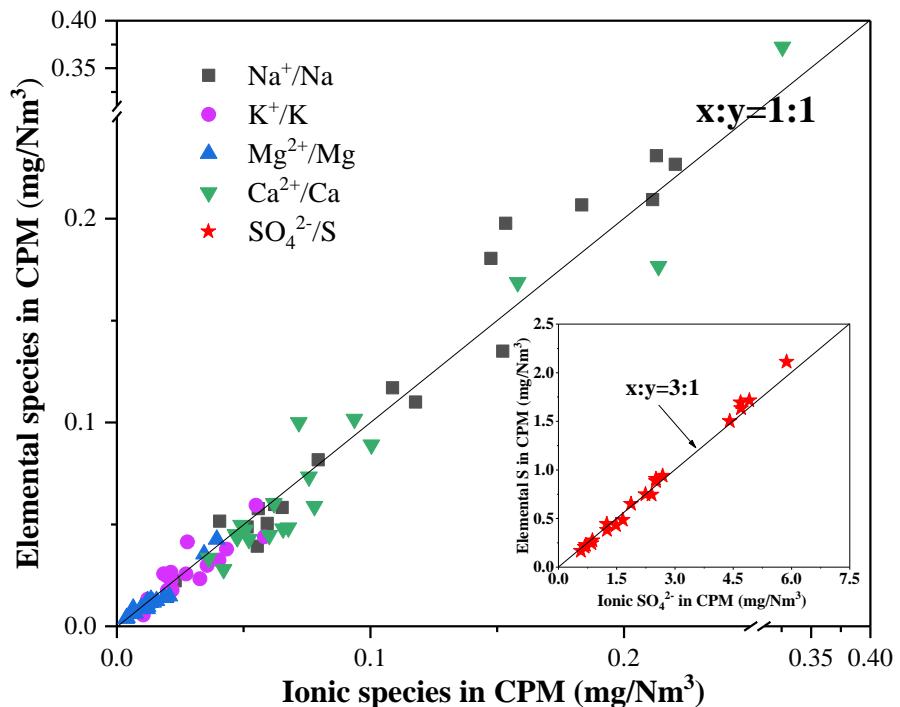


Figure S4. Mass concentrations (mg/Nm³) of some ionic and elemental species in CPM

S distribution in the stack emissions of CFPPs

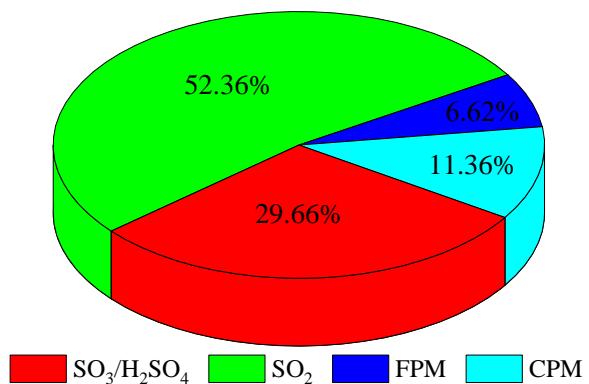


Figure S5. The proportions of S in $\text{SO}_3/\text{H}_2\text{SO}_4$, SO_2 , FPM, and CPM at the stack emissions