

Table S1. Distribution of sampling sites and actual operational condition of the unit

stage	operating load	temperature 1	sampling site	site name	temperature 2	sampling time	sample type
1	1000 MW	100.7 ± 2.7 °C	A		83.1 °C		
2	850 MW	99.3 ± 1.4 °C	B	at the	89.7 °C	90 minutes	CPM and
3	650 MW	99.7 ± 2.1 °C	C	stack	83.4 °C	per sample	FPM
4	650 MW	89.6 ± 0.8 °C	D		86.0 °C		

Note: Temperature 1 = The temperature of coal-fired flue gas at the inlet of LLT-ESP. Temperature 2 = The average temperature of coal-fired flue gas at the outlet of the stack.

Table S2. Concentrations of inorganic component in CPM emitted from the unit

Species	Stage 1	Stage 2	Stage 3	Stage 4
Na ⁺	0.02	0.02	0.05	0.03
Ca ²⁺	0.28	0.27	0.50	0.39
Al ³⁺	0.03	0.03	0.04	0.03
Mg ²⁺	0.04	0.04	0.04	0.26
NH ₄ ⁺	0.15	0.18	0.18	0.11
SO ₄ ²⁻	1.06	0.65	1.04	1.46
NO ₃ ⁻	0.02	0.02	0.01	0.01
F ⁻	0.01	0.01	0.01	0.01
Cl ⁻	0.09	0.09	0.09	0.08

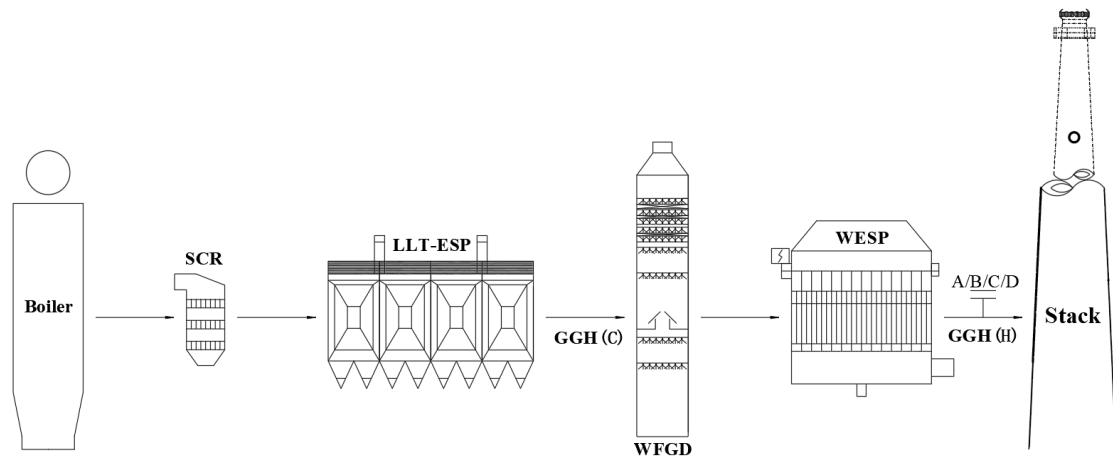


Fig. S1. Schematic showing the APCDs and sampling sites in coal-fired power units GGH(C), a cooling section of the gas-gas heat exchanger; GGH(H), a heating section of the gas-gas heat exchanger.

Description:

The unit is a circulating fluidized bed coal-fired boiler with an installed capacity of 1000 MW, a selective catalytic reduction (SCR) denitration device, a low-low temperature electrostatic precipitator (LLT-ESP), a wet flue gas desulfurization (WFGD) device, and a wet electrostatic precipitator (WESP) as APCDs.

Ultra-low emission reformation: Yes

Purpose: Electricity generation

Location: South of China (Zhejiang Province)

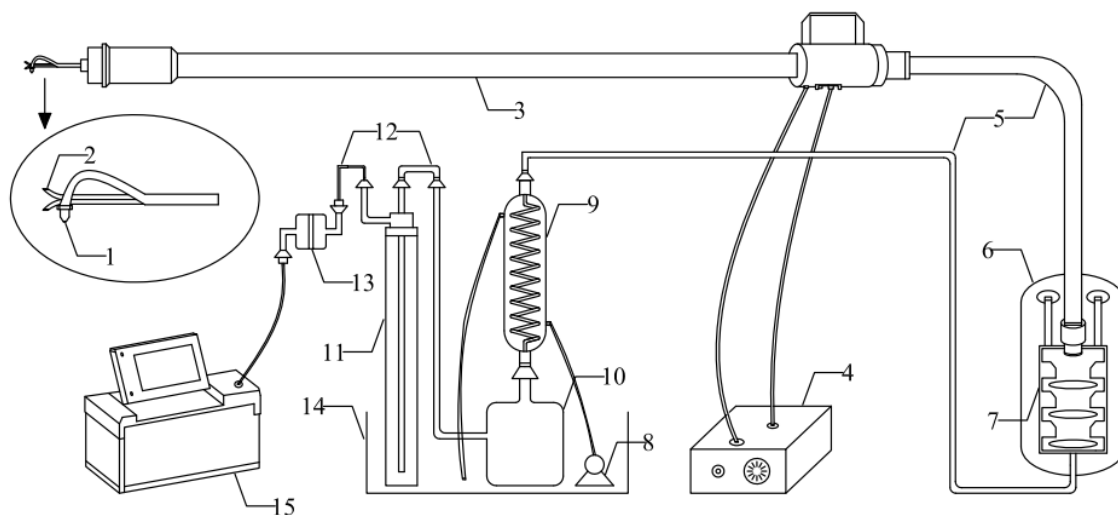


Fig. S2. Schematic of the simultaneous sampling system of FPM and CPM in flue gas
 1, isokinetic nozzles; 2, pitot tube; 3, stainless steel sampling tube; 4, temperature control box (The function is to heat and control the temperature of the nozzles, sampling tube, and pipeline); 5, polytetrafluoroethylene tube; 6, impactor heater and heater controller; 7, Dekati PM₁₀ impactor; 8, recirculation pump; 9, condenser; 10, short stem impactor; 11, long stem impactor; 12, connector; 13, condensable PM filter; 14, water bath; 15, ZR-7100 portable dust direct reading instrument

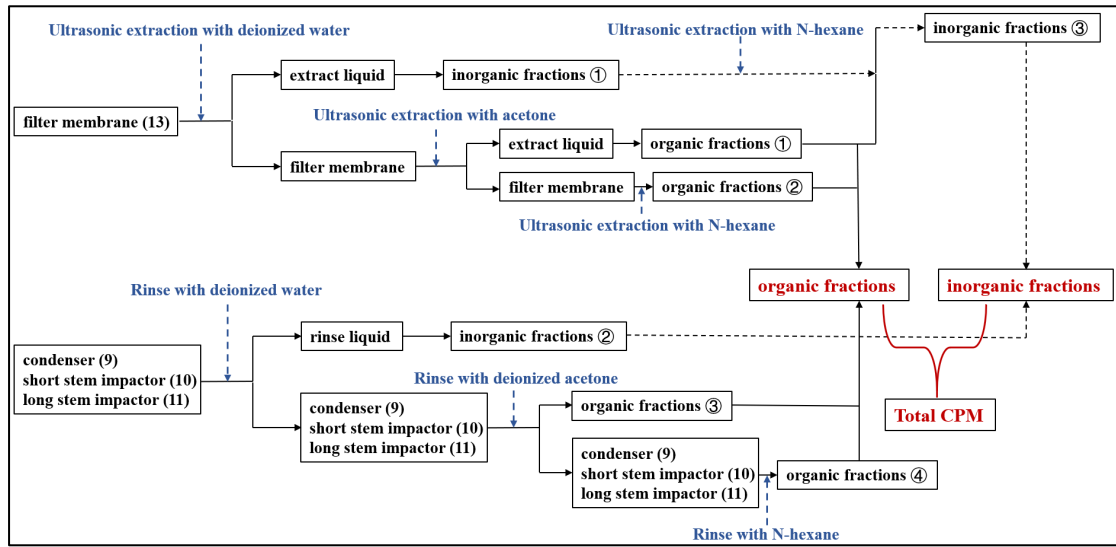


Fig. S3. Pre-treatment procedure for CPM in detail