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Cadmium isotope fractionation during coal combustion: Insights from two U.S. coal-fired power plants

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ACCEPTED MANUSCRIPT

1	Cadmium isotope fractionation during coal combustion: insights from two U.S.
2	coal-fired power plants
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12	Abstract Coal combustion, one of the principal energy sources of electricity in the
13	United States, produces over 100 million tons of coal combustion products (CCPs) per
14	year in the U.S. The reuse and disposal of CCPs has the potential to release toxic trace
15	elements, including cadmium (Cd), into the environment. In this study, we investigated
16	CCPs, including bottom ash (BA), economizer fly ash (EFA), and fly ash (FA), as well as
17	feed coal (FC) and pulverized coal (PC) collected from two U.S. coal-fired power plants
18	in New Mexico and Ohio with different coal supplies. The New Mexico plant uses high
19	volatile C bituminous, low-sulfur coals mined from the San Juan Basin (Cretaceous
20	Fruitland Formation) and the Ohio plant uses high volatile A bituminous, high-sulfur
21	central Appalachian Basin coals (Upper Pennsylvanian Monongahela Formation).
22	Mineralogical and elemental analysis showed that these CCP samples consist of ~70%
23	amorphous Al-Si-rich glasses and ~30% mineral phases of quartz (SiO ₂) and mullite
24	(Ai ₆ Si ₂ O ₁₃). The Cd isotope compositions (δ^{114} Cd, normalized to NIST Cd standard

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