

Impact of Sulfur Oxides on Mercury Capture by Activated Carbons

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Abstract

Recent field tests of mercury removal with activated carbon injection (ACI) have revealed that mercury capture is limited in flue gases containing high concentrations of sulfur oxides (SO_x). In order to gain a more complete understanding of the impact of SO_x on ACI, mercury capture was tested under varying conditions of SO₂ and SO₃ concentrations using a packed bed reactor and simulated flue gases. Continuous mercury concentration measurements were made downstream of the packed bed. Mercury capacity of activated carbon during a 6 hour exposure to mercury-laden simulated flue gas is inversely proportional to the S⁶⁺ content of the carbon. The high S⁶⁺ content limits both the 6 hour capacity of the activated carbon as well as the initial mercury removal efficiency. The activated carbon sample with the highest sulfur content tested here captured a minimal amount of mercury; however, this sample oxidized ~ 30% of the incident Hg⁰ at 100% breakthrough. This finding suggests that there are multiple available sites for mercury interaction with the sorbent surface, and that capture and oxidation may occur at different surface sites.

References

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