

REACTION KINETICS, CATALYSIS AND REACTION ENGINEERING

模拟城市垃圾焚烧中硫化物对重金属Cd迁移分布的影响

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收稿日期 2007-4-12 修回日期 网络版发布日期 接受日期 2007-7-21

摘要 The effect of sulfur compounds (including sulfur, sulfide, sulfite and sulfate), initial concentration of heavy metal and operating conditions on Cd emission in municipal solid waste (MSW) incineration were investigated using a simulated tubular furnace and simulated MSW spiked with Cd. The concentration of Cd was measured by inductively coupled plasma-atomic emission spectrometry (ICP-AES) after digesting the samples including bottom ash, fly ash and flue gas according to related USEPA methods. The results show that S and Na₂S tend to increase Cd partitioning in bottom ash, whereas Na₂SO₃ and Na₂SO₄ tend to reduce Cd partitioning in bottom ash. The effect of sulfur compounds on Cd partitioning in bottom ash was in the sequence of Na₂S>S>Na₂SO₃>Na₂SO₄. chemical equilibrium analysis is also performed to determine the effect of sorbents on Cd adsorption. The calculations show that S presents strong affinity for Cd and restrains Cd adsorption by SiO₂, whereas when temperature rises to between 830°C and 1030°C, Cd adsorption efficiency of SiO₂ is over 80% and the efficiency of Al₂O₃ is up to 85%.

关键词 [Cd](#) [municipal solid waste](#) [incineration](#) [sulfur](#) [partitioning](#)

分类号

DOI:

Effects of sulfur compounds on Cd partitioning in a simulated municipal solid waste incinerator

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Received 2007-4-12 Revised Online Accepted 2007-7-21

Abstract The effect of sulfur compounds (including sulfur, sulfide, sulfite and sulfate), initial concentration of heavy metal and operating conditions on Cd emission in municipal solid waste (MSW) incineration were investigated using a simulated tubular furnace and simulated MSW spiked with Cd. The concentration of Cd was measured by inductively coupled plasma-atomic emission spectrometry (ICP-AES) after digesting the samples including bottom ash, fly ash and flue gas according to related USEPA methods. The results show that S and Na₂S tend to increase Cd partitioning in bottom ash, whereas Na₂SO₃ and Na₂SO₄ tend to reduce Cd partitioning in bottom ash. The effect of sulfur compounds on Cd partitioning in bottom ash was in the sequence of Na₂S>S>Na₂SO₃>Na₂SO₄. chemical equilibrium analysis is also performed to determine the effect of sorbents on Cd adsorption. The calculations show that S presents strong affinity for Cd and restrains Cd adsorption by SiO₂, whereas when temperature rises to between 830°C and 1030°C, Cd adsorption efficiency of SiO₂ is over 80% and the efficiency of Al₂O₃ is up to 85%.

Key words [Cd](#); [municipal solid waste](#); [incineration](#); [sulfur](#); [partitioning](#)

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