Combustion aerosols from municipal waste incineration - Effect of fuel feedstock and plant operation - DTU Orbit (23/12/2018)

**Combustion aerosols from municipal waste incineration - Effect of fuel feedstock and plant operation**

Combustion aerosols were measured in a 22MW (thermal energy) municipal waste incinerator. Different types of waste fractions were added to a base-load waste and the effect on aerosol formation was measured. The waste fractions applied were: PVC plastic, pressure-impregnated wood, shoes, salt (NaCl), batteries, and automotive shredder waste. Also, runs with different changes in the operational conditions of the incinerator were made. Mass-based particle size distributions were measured using a cascade impactor and the number-based size distributions were measured using a Scanning Mobility Particle Sizer. The plant is equipped with flue gas cleaning and the penetration through this was determined. The particle morphology was investigated by Transmission Electron Microscopy (TEM) and chemical analysis of the aerosol particles was made by Energy Dispersive X-ray Spectroscopy (EDS). The mass-based particle size distribution was bimodal with a fine mode peak around 0.4 mm and a coarse mode peak around 100 μm. The addition of NaCl, shredder waste, and impregnated wood increased the mass concentration of fine particles (aerodynamic diameter below 2.5 μm). In general the mass concentration was stable and close to the reference PM2.5 value of 252 +/- 21 mg/m³ (std. T, P). The total number concentration deviated during runs and between runs spanning from 43.10^6 to 87.10^6#/cm³ (std. T, P). The aerosols formed were mixtures of dense and aggregated particles in all tests. The fine particles are mainly composed by alkali salts, zinc, and lead. The heavy metals Cu, Cd, Hg, and Pb are significantly enriched in the fine particles.

**General information**

State: Published
Organisations: CHEC Research Centre, Department of Chemical and Biochemical Engineering, Department of Environmental Engineering, IT Service
Pages: 2171-2198
Publication date: 2007
Peer-reviewed: Yes

**Publication information**

Journal: Combustion Science and Technology
Volume: 179
Issue number: 10
ISSN (Print): 0010-2202
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.59 SJR 0.683 SNIP 0.88
Web of Science (2017): Impact factor 1.132
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.46 SJR 0.417 SNIP 1
Web of Science (2016): Impact factor 1.241
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.52 SJR 0.833 SNIP 0.976
Web of Science (2015): Impact factor 1.193
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.19 SJR 0.461 SNIP 0.904
Web of Science (2014): Impact factor 0.991
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 1.15 SJR 0.616 SNIP 0.922
Web of Science (2013): Impact factor 0.976
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 1.2 SJR 0.446 SNIP 1.027
Web of Science (2012): Impact factor 1.011
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.41 SJR 0.932 SNIP 1.015