

DIFFERENTIAL PARTITIONING AND SPECIATION OF Hg IN WET FGD FACILITIES OF PCC POWER PLANTS

Oriol Font¹, Raquel Ochoa-Gonzalez², Mercedes Díaz-Somoano², Carlos Leiva³, Maria Izquierdo¹, M. Antonia López-Antón², Xavier Querol¹, M. Rosa Martínez-Tarazona², Constantino Fernández³, Alfredo Tomás⁴, Pedro Gómez⁴, Antonio Giménez⁴

¹Institute of Environmental Assessment and Water Research ((IDÆA-CSIC), and Institute of Earth Sciences "Jaume Almera", (ICTJA-CSIC), Jordi Girona 18-26, E-08034, Barcelona, Spain and Lluís Solé Sabarís, s/n, 08028 Barcelona, Spain.

²Instituto Nacional del Carbón (INCAR-CSIC), Francisco Pintado Fe, 26, 33011, Oviedo, Spain.

³Escuela Superior de Ingenieros de Sevilla, Departamento de Ingeniería Química y Ambiental, Camino de los Descubrimientos, s/n. Isla de la Cartuja, 41092 Sevilla, Spain

⁴ENDESA GENERACIÓN, S.A. Ribera del Loira, 60, planta 2, sector E, 28042, Madrid, Spain

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ABSTRACT

The speciation and partitioning of Hg from two Spanish pulverized coal (co) combustion (PCC) power plants equipped with wet limestone-based flue gas desulphurization facilities (FGD) were determined. The results were obtained from simultaneous sampling of solid, liquid and gaseous streams in the power plants and measured in duplicate in two laboratories. The behavior, partitioning and speciation of Hg are similar during combustion but differ after the FGD process in both power plants. A high proportion (86-88 %) of Hg escapes the ESP in gaseous form, being Hg²⁺ the predominant Hg species (75-86 %) incoming the FGD. Also, a similar and relatively high retention potential for total Hg (64-74 %) was achieved in both FGD facilities, being Hg²⁺ the prevalent Hg species retained by desulphurization process (72-90 %). Low abatement capacity was obtained for Hg⁰ (up to 25 %). The prevalent Hg species after FGD, depends on the input of Hg, being Hg⁰ (71 %) at low Hg inputs and Hg²⁺ (66 %) at high Hg inputs. Furthermore, the partitioning of Hg differs between both FGD systems. A major retention of Hg (52 %) in FGD-gypsum was found with lower proportions of water soluble Hg (9 % in the effluent) being while 38 % is emitted as gaseous Hg, in the low Hg input power plant. Conversely, very high fraction (80 %) of the incoming Hg is water soluble while only 6 % was captured by gypsum in the power plant with high Hg input. In this plant the emitted Hg accounted only 14 %. Most probably the different input and/or different mode of occurrence of Hg due to different operational conditions, modifying the partitioning of this pollutant in wet FGD systems.

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