

EFFECT OF THE ADDITION OF PETCOKE ON THE PARTITIONING OF TRACE ELEMENTS IN PULVERISED COAL COMBUSTION (PCC) PLANTS

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ABSTRACT

The co-combustion of coal is becoming increasingly important owing to the environmental and economical benefits that it supposes. However, it may have environmental implications such as the potential increase in the volatility of some trace pollutants or changes in the speciation. Since the new environmental regulations in the European Union (EU), novel alternatives in co-combustion are being applied. However, no previous studies are available determining how emissions and combustion products could be modified. In this study the effect of co-combustion of coal and pet coke on the partitioning of trace pollutants during co-combustion of coal in a power plant was investigated. The results revealed an increase of the volatile behaviour of Sb and Sn (40 % increased), B (30 %), As and Cl (20 %) and F and Se (10 %) when pet coke is added (up to 30 %) in feed fuel blends, with respect to power plants firing 100 % coal. This adjustment of the partitioning has to be attributed to the major organic affinity in pet coke, which assists the volatilization of S, Cl, F, B, V, Ni and Mo. Therefore, a high volatile fraction of these elements promotes the occurrence of high volatile As, Sb, Sn and Se chlorides and volatile F and B species, explaining their high volatile behaviour. Furthermore, the high volatility of S, V, Ni and Mo results in a high occurrence of sulphates and V-Ni-Mo free oxides or salts in fly ash, with potential implications in the leachable fractions of these metals.

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