

CARBON MATERIALS APPLICATION IN POLYAROMATICS ABATEMENT

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Introduction

In current research, the efforts are aimed toward technical and economic improvements seeking new ways to get cheaper and cleaner coal conversion processes. Coal FBC is generally considered to be an environmentally favorable combustion technology where control of emissions can be integrated into the combustion system. But not only CO_x, NO_x, SO_x, are emitted. In lower amount but with stronger environmental impact, volatile organic compounds (VOC) are emitted as well. And from VOC, the polyaromatic compounds promote carcinoma formation.

The first task of this work has been to analyze the performance of different carbon materials trapping the polyaromatic hydrocarbons emitted to the atmosphere from coal combustion in an AFBC laboratory scale plant.

Experimental

The coal combustion has been carried out in a FB reactor (i.d. 7cm), keeping constant the gas flow, the excess oxygen percentage and the combustion temperature.

The outlet gas stream, after passing through cyclones, was forced to pass through a sampling system for retaining micro and sub-micro-particulate material through the carbon material and finally XAD-2 resin was placed as witness of the carbon material (CM) efficacy (*E*).

The efficacy of the carbon materials was calculate as follow:

$$E = \frac{\text{mg/Kg of PAH in the CM}}{\text{mg/Kg of total PAH (resin+CM)}} \quad (1)$$

The behavior as CM of Feincoks, two apricot stones and two carbon blacks from automotive tires, after activation, was analyzed.

Results

The polyaromatic hydrocarbons were identify and quantify by FS after extraction with DMF. Chars characterization and results on efficacy reached by the corresponding chars adsorbing Fluorene, Acenaphthylene and Anthracene are shown in Table 1.

Acknowledgements

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Adsorbent	Origin	m ² /g	Efficacy
XAD-2 resin	Merck	361	1
Activate carbon	Feincoks	248	0.59
Activate carbon	Apricot stones (1)	1280	0.29
Activate carbon	Apricot stones (2)	1100	0.45
Carbon black	Tire (1)	650	0.88
Carbon black	Tire (2)	120	0.40

Table 1. Surface area and efficacies data for the carbon materials studied