

燃煤锅炉受热面壁温及结渣监测实验研究【上架时间：2023-03-30】



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分类	:	论文	
价格	:	¥ 0.00	

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【标题】燃煤锅炉受热面壁温及结渣监测实验研究

【Title】 Experimental Study on Monitoring of Wall Temperature and Slagging of Heating Surface in Coal-Fired Boiler

【摘要】准东高碱煤的高比例掺烧对锅炉积灰结渣监测这一传统问题提出了新的需求。本文通过建立辐射成像模型,采用蒙特卡洛法精确求解探测器接收的火焰辐射和壁面辐射,并建立了透过火焰获得壁面图像的判据。对于燃煤锅炉可选用感光波段3-5um的中波红外探测器进行锅炉受热面成像监测,在探测器布置时应避开火焰高温区,减小探测器与壁面之间火焰的光学厚度。在一台着火炉上开展了实验验证,利用中波红外探测器获得了火焰后的壁面图像,并测量了壁面对应的图像温度,与热电偶测量结果基本吻合。本研究将为燃煤锅炉受热面结渣监测提供重要参考。

[Abstract] The high proportion of Zhundong high-alkali coal blending puts forward a new demand for the traditional problem of boiler ash deposition and slagging monitoring. In this paper, a radiation imaging model was established, and then the Monte Carlo method was used to accurately solve the flame radiation and wall radiation received by the detector, and the criterion for obtaining the wall image through the flame is established. For coal-fired boilers, a medium-wave infrared detector with a photosensitive band of 3–5 μm can be used for imaging monitoring of the heating surface of the boiler. When the detector is arranged, the high temperature area of the flame should be avoided, and the optical thickness of the flame between the detector and the wall should be reduced. The experimental verification was carried out on a burning furnace. The mid-wave infrared detector was used to obtain the image of the wall which behind the flame, and the temperature of the image corresponding to the wall was measured, which was basically consistent with the measurement result of the thermocouple. This study will provide an important reference for the monitoring of slagging on the heating surface in coal-fired boilers.

【关键词】 锅炉; 受热面; 结渣; 辐射图像; 蒙特卡洛

【Keywords】 coal-fired boiler; heating surface; slagging; radiation image; Monte Carlo

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【来源】2022年中国电机工程学会年会论文集

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