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密集烤房碳纤维增强水泥基复合材料供热设备的设计与试验

Design and experiment of carbon fiber reinforced cement based composite material heating equipment for bulk curing barn

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英文关键词:heating equipment design bulk curing barn non-metallic material thermal efficiency

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中文摘要:

为优化密集烤房供热设备的结构和性能，采用碳纤维增强水泥基复合材料（CFRC）和回流区分级着火燃烧技术，设计了适用于密集烤房的一次性加煤隧道式炉体新材料火炉和由12根直径190 mm散热管4-4-4三层横列构成的新材料散热器。检测结果表明，新材料火炉和散热器的导热系数分别是普通耐火材料的1.5倍和3.2倍，整体热效率比普通耐火材料高4.5%，散热管的耐腐蚀性能是金属材料（NS钢）的5.3倍，显著增强了密集烤房的供热性能，延长了供热设备的使用寿命。烟叶烘烤试验结果表明，新材料供热设备密集烤房的升温性能好，稳温性能强，烤后烟叶上等烟比例分别比普通耐火材料和金属材料供热设备密集烤房增加2.6%和2.3%，烟叶烘烤耗煤量分别减少8.5%和13.2%，节能降耗效果显著。

英文摘要:

In order to optimize the structural and performance of heating equipments of bulk curing barn, carbon fiber reinforced cement based composite (CFRC) material and recirculating zone staged igniting combustion technology were adopted to design new material heating equipments, which includes a tunnel type stove with disposable feeding coal and a radiator on the structured of 12 diameter 190 mm heating tubes arranged in 4-4-4 three layers of rank. By testing the thermal performance and corrosion resistance, the results indicated that the thermal conductivity of new material stove and radiator were 1.5 and 3.2 times of the common refractory devices respectively, and the overall thermal efficiency of new material heating equipments was increased by 4.5%. Therefore, the heating performance and service life of heating equipments for bulk curing barn were improved significantly. The corrosion resistance of new material heating tube was 5.3 times of the metal (NS steel) tube. The results of tobacco curing experiments showed that the heating and temperature stable performance of the new material heating equipments bulk curing barn were better than that of refractory and metal devices barn. Compared with the bulk barn of refractory and metal equipments, the ratios of superior leaves cured in the barn of new material equipments were increased by 2.6% and 2.3%, and the coal consumption reduced by 8.5% and 13.2% respectively. The effect of energy saving for tobacco curing is significant.

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