5th International Conference on Carbon for Energy Storage/Conversion and Environment Protection

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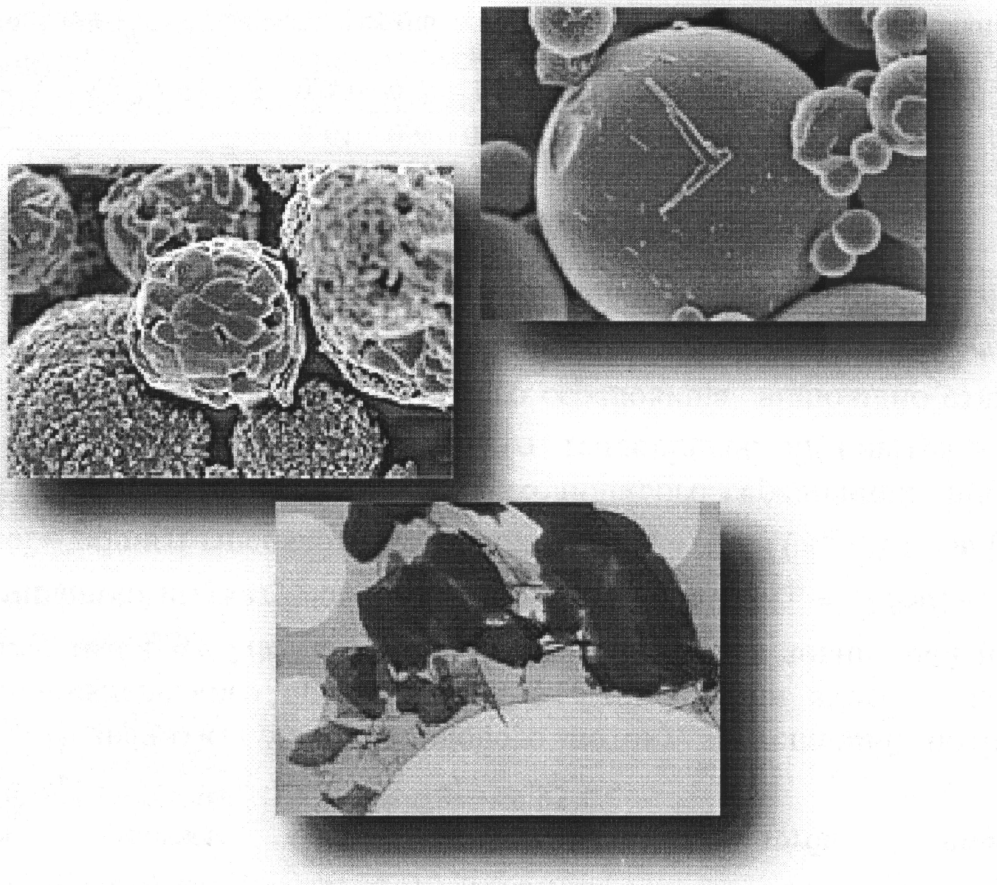

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PROGRAMME AND ABSTRACT BOOK

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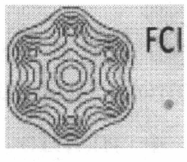

Recovering adsorptive properties of schungite after processing red beet juice

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Introduction

When producing food dye from red beet juice part of impurities, especially pectin substances, is adsorbed by the carbon adsorbent – shungite, containing fullerenes and fullerene nanotubes. During adsorption of red beet juice, surface and pores of shungite are filled with impurities, resulting in decrease of its adsorptive properties.

The purpose of the present studies was to select an effective method for regeneration of adsorbent and to establish rational technological parameters of this process.

When choosing a method of regeneration, the authors of this paper were motivated by economic feasibility and took into account the availability of necessary equipment at canning factories.

Methods used

From this point of view, the most suitable method for shungite recovery is to use overheated steam. Recovered through this method sorbent was re-used for purifying red beet juice from pectin substances. The purification effect - the ratio of the difference between quantity of impurities in sample and in processed juice to the content of impurities in unprocessed red beet juice - served as criteria for assessing the amount of adsorbed impurities.

The obtained results of the research showed that the highest effect of purifying red beet juice from pectin substances of 34% is achieved by processing juice with shungite, recovered at t = 170°C during 30 minutes with mass flow rate of steam $2.3 \cdot 10^{-3}$ kg/s and steam pressure of 0.3 MPa.

Regeneration multiplicity

Significant practical and scientific interest lies in the question of how many times shungite could be used for adsorbing pectin substances from red beet juice. For this purpose, overheated steam at t = 170°C was let through a layer of adsorbent for 30 minutes, then shungite was cooled and used for processing juice. Analysis of the obtained results made it possible to conclude that five-time regenerated shungite effectively adsorbs pectin substances from red beet juice. After further regeneration shungite's adsorptive properties are reduced drastically. Spent shungite should be burned as solid fuel.