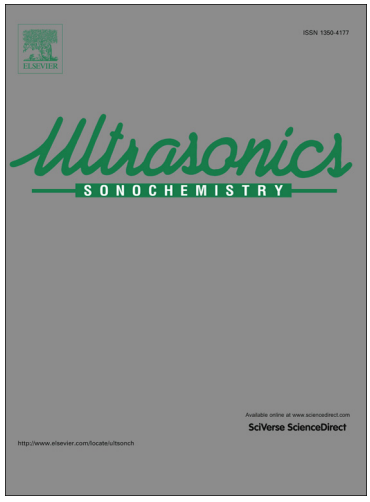

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Study on Regeneration Effect and Mechanism of High-Frequency Ultrasound on Biological Activated Carbon

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Abstract

High frequency ultrasonic radiation technology was developed as a novel and efficient means of regenerating spent biological activated carbon (BAC) used in drinking water treatment plants (DWTPs). The results of this study indicated that high frequency ultrasonic treatment could recover the spent BAC, to some extent, with the following optimal conditions: a frequency of 400kHz, sonication power of 60W, water temperature of 30°C, and sonication time of 6 min. Under the above conditions, the iodine value increased from 300 mg/g to 409 mg/g, the volume of total pores and micropores increased from 0.2600 cm^3/g and 0.1779 cm^3/g to 0.3560 cm^3/g and 0.2662 cm^3/g, respectively; the specific surface area of micropores and the mean pore diameter expanded from 361.15 m^2/g and 2.0975 nm to 449.92 m^2/g and 2.1268 nm, respectively. The biological activity increased from 0.0297 $mgO_2/gC·h$ to 0.0521 $mgO_2/gC·h$, while the biomass decreased from 203 nmolP/gC to 180 nmolP/gC. The results of high throughput 16S rRNA gene amplicon