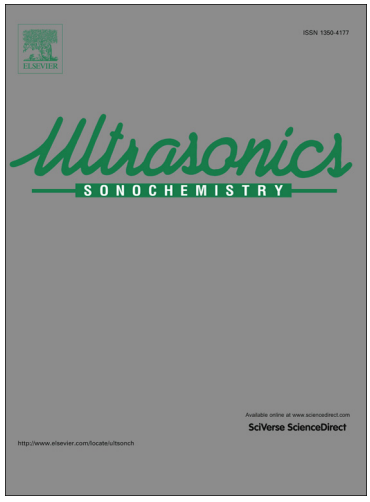

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Formation of Inorganic Nitrogenous Byproducts in Aqueous Solution under Ultrasound Irradiation

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Abstract: The effects of ultrasonic frequency, power intensity, temperature and sparged gas on the generation of nitrogenous by-products NO_2^- and NO_3^- have been investigated, and the new kinetics model of NO_2^- and NO_3^- generation was also explored. The results show that the highest primary generation rate of NO_2^- and NO_3^- by direct sonolysis in the cavitation bubbles (represented by k_1'and k_2',respectively) was obtained at 600 kHz and 200 kHz, respectively, in the applied ultrasonic frequency range of 200 to 800 kHz. The primary generation rate of NO_2^- (represented by k_1') increased with the increasing ultrasonic intensity while the primary generation rate of NO_3^- (represented by k_2') decreased. The lower temperature is beneficial to the primary generation of both NO_2^- and NO_3^- in the cavitation bubbles. The optimal overall yields of both NO_2^- and NO_3^- were obtained at the N_2 / O_2 volume (in the

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