

五氯苯酚降解的超声诱导

沈壮志,程建政,吴胜举

中国科学院武汉物理数学研究所;陕西师范大学应用声学研究所

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摘要 人为或自然因素会导致挥发性或不挥发有毒有机物存在于饮用水中,这一现象已成为国际上共同关心的问题。从长期对健康状况来说,即使不能辨别饮用水中的味道和气味,但只要有十亿分之几毫克的有毒有机物存在,就足以使水不能饮用。所以,废水处理刻不容缓。同废水处理相关的实验方法中,超声作为一种处理方法,早有报道,因为超声化学效应主要是空化,空化是自由基,特别是羟基自由基产生的根源,而羟基自由基是强烈而非特殊的氧化物,它能迅速同水中化合物发生反应。作者以五氯苯酚为模拟水样,分别用低频(16 kHz)和高频[(800 ± 1) kHz]以及其组合进行超声降解研究。研究表明复频降解效果最好,最差为低频。在Fenton类试剂存在下,与Fenton类单独降解效果相比,复频则是它的20.93倍,高频是它的4.9倍,低频与它几乎无变化。实验表明,频率组合对有机污染物的降解是一条有效途径,但需要更进一步的研究。

关键词 [苯酚 P](#) [羟基](#) [游离基](#) [降解](#) [诱导](#) [有机污染物](#)

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Ultrasonic-Induced Degradation of Pentachlorophenol

Shen Zhuangzhi, Cheng Jianzheng, Wu Shengju

Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences; Institute of Applied Acoustic, Shaanxi Normal University

Abstract The presence of human-derived or naturally occurring volatile or nonvolatile toxic organic compounds in drinking water has become a problem of international concern. The presence of some toxic organic compounds in a few parts per billion is enough to render a water supply unpotable because it is harmful to long-term health, even though the water may have no discernible taste and odor. So waste water must be treated. There are several reports about water treatment in early literatures which use the power ultrasound wave to degrade the organic compounds in water. The chemical effects of ultrasound derive from acoustic cavitation. Cavitation is a source of radicals, especially the hydroxy radical, "OH, the very strong and nonspecific oxidant which escapes out of the bubble and reacts rapidly with compounds in solution. In this paper, degradation effects of ultrasound on pentachlorophenol (PCP) is researched. PCP is treated by low frequency (16 kHz), high frequency [(800 ± 1) kHz], and bi-frequency (combined of 16 kHz and 800 kHz) ultrasound wave, respectively. The results show that the rate of PCP degradation under the same conditions is highest at bi-frequency, lowest at 16 kHz. In the presence of Fenton type reagent the rate of PCP degradation is highest at bi-frequency which is 20.93 times as high as that of the stirring system without ultrasound wave. The ratios are 4.91 and 1.06 at 800 and 16 kHz, respectively. The studies show that the bi-frequency ultrasound is an effective method for pollutants degradation, but it needs to make further study.

Key words [PHENOL P](#) [HYDROXY GROUP](#) [FREE RADICAL](#) [DEGRADATION](#) [INDUCTION](#) [ORGANIC POLLUTANTS](#)

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