


詹良通,罗小勇,冯源,陈云敏·采用移动电极法提高机械脱水污泥电动脱水能效的试验研究[J].环境科学学报,2013,33(8):2264-2269

采用移动电极法提高机械脱水污泥电动脱水能效的试验研究 

### Experimental study on efficiency of electrokinetic dewatering technique with movable electrodes for sewage sludge

关键词: [污泥](#) [电动脱水](#) [移动电极](#) [电压梯度](#) [脱水效果](#) [能耗](#)

基金项目: [国家自然科学基金重大国际合作项目\(No.51010008\)](#)

作者 单位

詹良通 浙江大学软弱土与环境土工教育部重点实验室, 杭州 310058

罗小勇 上海市政工程设计研究院, 上海 200092

冯源 浙江大学软弱土与环境土工教育部重点实验室, 杭州 310058

陈云敏 浙江大学软弱土与环境土工教育部重点实验室, 杭州 310058

**摘要:** 采用一种能移动阳极的电动脱水模型试验装置,对机械脱水污泥开展了固定间距电极和移动电极的电动脱水试验,比较分析了这2种方法的脱水效果及对应的能耗。试验结果表明:固定间距电极法脱水处理过程中,阳极附近已脱水污泥的阻抗增加,消耗的电压和电能上升;而后面未脱水污泥分得的电压下降,导致其脱水效果从阳极至阴极衰减。移动电极法通过移动阳极逐步越过已脱水污泥部分,将电压作用在未脱水的污泥,避免了电能消耗在高阻抗的脱水污泥,显著提高了能效,脱水过程中电渗流量稳定,脱水效果均匀。采用移动电极法进行脱水处理时能耗随加载电压梯度的增加而上升,随试样长度的缩短而降低。当采用 $8\text{ V}\cdot\text{cm}^{-1}$ 电压梯度的移动电极处理5 cm长度的污泥时,污泥含水率可由初始的82.1%降至62.2%,所需要的能耗约为 $89.8\text{ kW}\cdot\text{h}\cdot\text{m}^{-3}$ 。

**Abstract:** This paper presents an experimental study on electrokinetic dewatering of sewage sludge by using an innovate apparatus with movable electrodes. Parallel tests were carried out by fixing and removing the electrodes. The experimental results were analyzed and compared in terms of dewatering effect and energy consumption. The experiments with fixing electrode showed that during dewatering the impedance of the dewatered sludge increased, and the consumed voltage and energy increased. Thus the voltage left for the undewatered sludge decreased, resulting in decrease of electroosmosis and non-uniform dewatering effect. For the experiments with removing electrode, the electrodes were removed to get across the dewatered sludge, avoiding the invalid energy consumption. Stable electroosmosis flow and uniform dewatering effect were obtained in the experiments with removing electrodes. The energy consumption increased with an increase of the applied voltage gradient and decreased with a decrease in the length of sludge specimen. When the removal method was applied on 1 cm long sludge specimen with a voltage gradient of  $8\text{ V}\cdot\text{cm}^{-1}$ , the sludge could be dewatered from water content of 82.1% to 62.2%, and the corresponding energy consumption was  $89.8\text{ kW}\cdot\text{h}\cdot\text{m}^{-3}$ .

**Key words:** [sludge](#) [electrokinetic dewatering](#) [movable electrodes](#) [voltage gradient](#) [dewatering effect](#) [energy consumption](#)

摘要点击次数: 152 全文下载次数: 181

[关闭](#)[下载PDF阅读器](#)

您是第3614353位访问者

主办单位: 中国科学院生态环境研究中心

单位地址: 北京市海淀区双清路18号 邮编: 100085

服务热线: 010-62941073 传真: 010-62941073 Email: [hjxxb@rcees.ac.cn](mailto:hjxxb@rcees.ac.cn)

