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基于微电极阵列和无线传感器网络的水环境重金属检测系统研究

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摘　要：

为对区域水环境中重金属进行有效检测，提出了一种基于无线传感器网络的重金属现场检测技术。为此，提出了一种带状微电极阵列芯片，用于锌、铅、铜等三种重金属离子的测量；基于带状微电极阵列芯片，开发了自动化的水环境重金属现场检测仪器；多台仪器通过802.11b/g无线协议组成无线传感器网络，对区域水环境中的重金属含量进行检测。在实验室通过重金属标准溶液对仪器性能进行验证，表明仪器具有较好的精确度；在自然水域进行了传输距离、无线组网测试；完成了自然水域样品重金属浓度检测，并同原子吸收法进行了对比验证。

关键词：带状微电极阵列；重金属现场检测；区域水环境；无线传感器网络

In-situ Heavy Metal Detection in Field Aquatic Environment based on Wireless Sensor Network

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Abstract:

To realize heavy metal detection in filed aquatic environment, a method of in-situ heavy metal detection based on wireless sensor network is presented. A homemade band micro electrode array (MEA) is introduced to detect heavy metal ions as Zn2+, Pb2+ and Cu2+. Automatic heavy metal monitoring instrument is developed based on the band MEA. In addition, wireless sensor network for field heavy metal monitoring can be constituted by distributed instruments via 802.11b/g standards. The instrument is certified by standard heavy metal solutions with different concentrations and shows good precision. Transmission range and network organizing are validated in nature water area. Finally, measuring precision of the instrument has been validated by monitoring natural Zn2+, Pb2+ and Cu2+ concentrations and comparing with atomic absorption spectrometry (AAS).

Keywords: Band micro electrode array; In-situ heavy metal detection; Field aquatic environment; Wireless sensor network

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