

激光与光电子技术应用

石墨富集方式下水中Cr元素的LIBS检测

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摘要: 为了在石墨富集的方式下测量并分析水中Cr元素的激光诱导击穿光谱特性,利用Nd:YAG脉冲激光器作为激发光源,以高分辨率、宽光谱段的中阶梯光栅光谱仪和增强型电荷耦合器件为光信号分离和探测器件,以Cr元素的425.435nm谱线作为分析线,研究了水中Cr元素的时间衰减特性。结果表明,最佳延时时间为1100ns,最佳门宽为1800ns,通过对具有不同Cr元素含量的样品的测量,给出了Cr元素的定标曲线,并最终计算取得Cr元素的检出限为0.520mg/L。这一结果为激光诱导击穿光谱应用于水中Cr元素的快速检测提供了数据参考。

关键词: 光谱学 激光诱导击穿光谱技术 水污染 Cr 石墨富集

Chromium detection in water enriched with graphite based on laser-induced breakdown spectroscopy

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Abstract: In order to study the spectroscopy emission characteristics of chromium in water enriched with graphite based on laser induced breakdown spectroscopy, the characteristic spectral line of 425.435nm was selected for chromium in the experiment when a Nd:YAG laser in 1064nm wavelength was used as an excitation source, the echelle spectrometer and intensified charge coupled device detector with high resolution and wide spectral range were used for spectral separation and high sensitive detection. The results show that detection optimal delay time is 1100ns and gate width time is 1800ns. The calibration curve of chromium was plotted based on different concentration measurement results, and the limit of detection was 0.520mg/L. The results of the experiment provide the data reference for fast measurement of chromium in water based on laser-induced breakdown spectroscopy.

Keywords: spectroscopy laser induced breakdown spectroscopy water pollution Cr enrichment with graphite

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