

· 监测技术 ·

便携式分光光度计法快速测定水中砷方法研究

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摘要:通过研究各仪器性能指标以及测定实际水质样品,对3种便携式分光光度计快速测定水中砷的方法进行了优化和对比研究。结果表明,ZZW-II测试仪快速测定水中砷的方法检出限(0.2 mg/L)高于JH 916检测仪和PORS-15 V光谱仪的方法检出限(0.008和0.009 mg/L),在突发性环境污染事故应急监测中,JH 916检测仪和PORS-15 V光谱仪具有相对较高的灵敏度。ZZW-II测试仪和JH 916检测仪快速测定水中砷的方法精密密度相近,其测定结果相对标准偏差均未超过5.7% ($n=6$),PORS-15 V光谱仪快速测定水中砷的方法精密密度稍差,其相对标准偏差最大值为17%。测定实际样品时,加标回收率分别为110%~126%(ZZW-II测试仪),63%~108%(PORS-15 V光谱仪),78%~101%(JH 916检测仪)。3种便携式分光光度计与实验室分析方法相比,测定结果精密密度均存在显著性差异,测定结果相对偏差亦较大,相对偏差最大值分别为-19.0%(ZZW-II测试仪),17.0%(PORS-15 V光谱仪),-15.0%(JH 916检测仪)。

关键词:便携式分光光度计;快速测定;砷;应急监测

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Research on Rapid Determination of Arsenic in Water Samples by Using Portable Spectrophotometers

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Abstract: Methods of rapid determination of arsenic in water samples by using three kinds of portable spectrophotometer were optimized and the contrast research on these methods was carried out in this paper. By testing the performance indexes of different instrumental methods and determining the arsenic in actual water samples, the advantages of different portable spectrophotometers were compared. The research result would be able to provide a reference for choosing the suitable monitoring instruments used in sudden environmental pollution accident. The experimental results showed: the detection limit of ZZW-II portable spectrophotometer (0.2 mg/L) was higher than that of JH 916 portable spectrophotometer (0.008mg/L) and PORS-15 V portable spectrophotometer (0.009 mg/L), it meant that the PORS-15 V portable spectrophotometer and JH 916 portable spectrophotometer had higher sensitivity in monitoring sudden environmental pollution accident than ZZW-II portable spectrophotometer. The method precision of JH 916 portable spectrophotometer and ZZW-II portable spectrophotometer were similar and the *RSDs* (relative standard deviation) were all below 5.7% ($n=6$). The method precision of PORS-15 V portable spectrophotometer was not better than the other two spectrophotometers, the maximal *RSD* was 17%. The recoveries were 110%~126% (ZZW-II portable spectrophotometer), 63%~108% (PORS-15 V portable spectrophotometer), 78%~101% (JH 916 portable spectrophotometer) for the actual water samples. There was significant difference between the precision of standard method in lab and the precision of the three kinds of portable spectrophotometer, the maximal relative deviations were -19.0% (ZZW-II portable spectrophotometer), 17.0% (PORS-15 V portable spectrophotometer), -15.0% (JH 916 portable spectrophotometer).

Key words: Portable spectrophotometer; Rapid determination; Arsenic; Emergency monitoring

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