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温度对液滴指纹图水质识别的影响分析

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摘　要：

研究水本身温度和环境温度的变化对液滴指纹图产生的影响，可为液滴分析仪仪器化设计提供参考。在环境温度保持在27℃左右时，对注射器中水的温度由57℃降至31.3℃期间，连续采集了16组液滴指纹图，比较各组液滴指纹图，光纤信号和电容信号的最大变化分别为0.17%和1.23%，与系统误差相当，说明水本身温度对液滴指纹图几乎无影响；以纯水在不同温度下的折射率、表面张力和介电常数值，计算了环境温度对纯水液滴测量信号的影响大小，计算结果表明：环境温度由18℃升至30℃时，光纤信号和电容信号的变化分别为0.64%和3%，对电容信号的影响较大。

关键词：水质识别；温度的影响；液滴指纹图；光纤信号；电容信号

The Impact Analysis of Temperature on the Identification of Water Applying Liquid Drop Fingerprint

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Abstract:

The research of water itself temperature’ and environmental temperature’ changes to the liquid droplet fingerprint provides a reference for the droplet analyzer instrumentation. During the period of experiment, the environmental temperature kept unchanged at about 27° C, while the temperature of the water in the syringe dropped from 57 ° C to 31.3 ° C, continuously collecting 16 groups of LDF, comparing the data, getting that the maximum change of optical fiber signal and capacitance signal were 0.17% and 1.23 respectively, equaling to the systematic error, which indicates water itself temperature has almost no influence to the LDF; Using refractive index, surface tension and dielectric constant value of water in different temperature, calculating the environmental temperature effect on pure water measuring signal, the results show that, environment temperature increasing from 18 to 30° C, the change of optical fiber signal and capacitance signal were 0.64% and 3% respectively, a significant impact on the capacitance signal.

Keywords: water quality identification; temperature influence; LDF (liquid droplet fingerprint); optical-fiber signal; capacitance signal

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