Analysis of the Liquids Composition by the Sound Produced by Their Heating

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In our previous studies it was demonstrated that the spectrum of the sound produced by liquids while being heated is influenced by their composition. This project is concentrated on developing a methodology for analyzing and controlling the quality and/or purity of liquids based on this phenomenon. The key point in this study is assembling the experimental set-up, which ensures reliable control over the side factors (temperature and volume of the liquid, power and size of the heater etc.), which also influence the sound spectrum and prevent to establish a unique correspondence between the spectrum and the composition of the liquid. The constructed set-up showed remarkable sensitivity, signal-to-noise ratio and very good reproducibility of the experimental conditions. With this improved set-up the sensitivity of the method was demonstrated by recording the sound from different concentrations of ethanol in water. The spectrum changes significantly by adding 1% of ethanol to the water, concentrations down to 0.1% can still be detected! Similar studies have been conducted in water solutions of methanol, isopropanol, soap and in carbonated water.

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