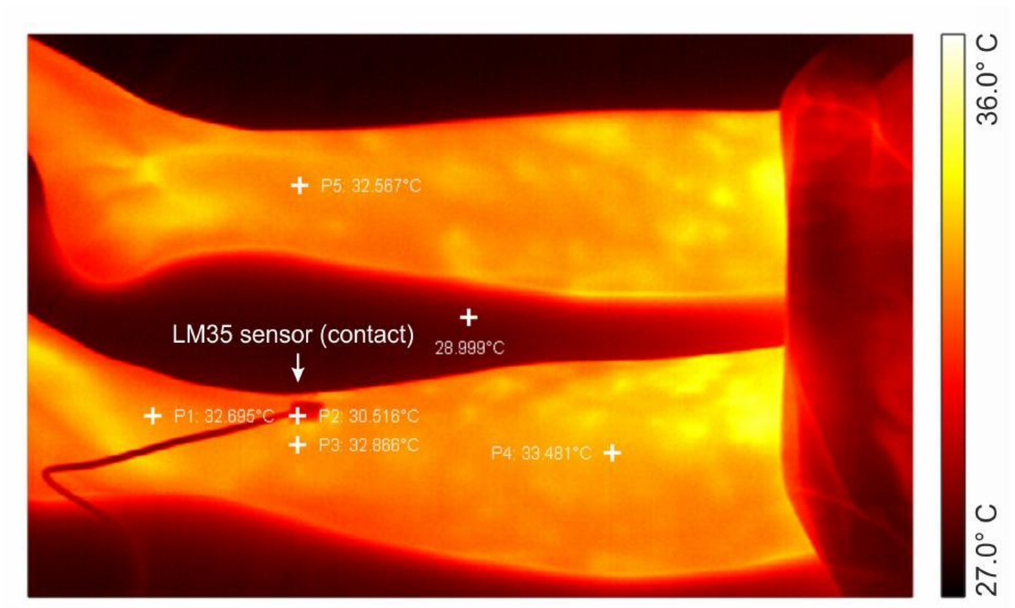
(a)

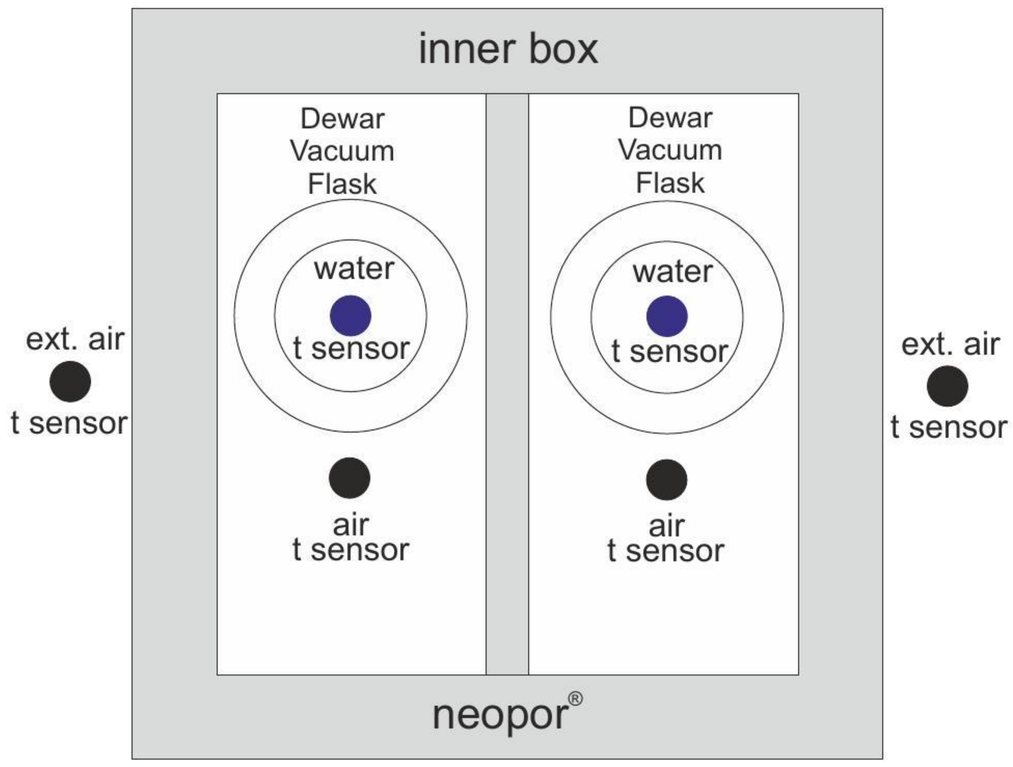
(b)



(c)

Figure 1. **(a)** The EEG, heart and breathing rate sensor for a real-time biofeedback and auditory control of ASC during meditation; **(b)** the LM35 precision temperature sensor fixed on the skin; **(c)**. IR thermal image, wavelength 8-14μm, NEDT $\leq$ 60mK (shown is the LM35 sensor measuring the skin surface temperature).

[29] showed that the use of real-time biofeedback in ASC has a positive effect on 'active meditation' practices with long-term focused attention. Body temperature is measured in two ways: skin and core temperature by contact LM35 precision sensor, connected to a high resolution logger and thermal emission in 8-14μm area by IR imaging sensor (NEDT $\leq$ 60mK). Both methods deliver the same temperature data, but differ significantly in terms of thermal dynamics: IR method requires open-skin regions that quickly cool down, while the contact method is best suited for measuring internal body dynamics.



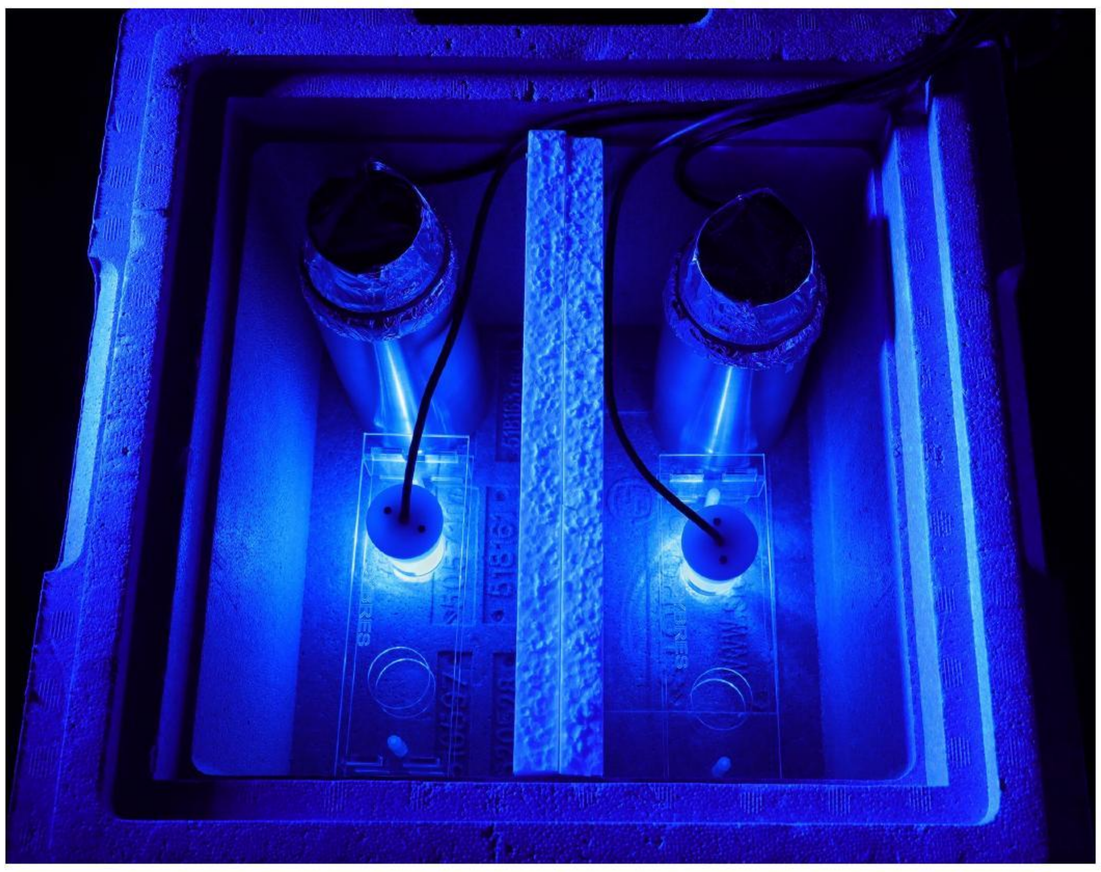


Figure 2. Passive differential calorimeter. **(a)** Scheme of the setup; **(b)** Image of the system with two Dewar vacuum flasks with NTC thermistor immersed in 15ml of water and two air temperature sensors.

Setup with differential calorimeter is shown in Fig. 2 and extends the earlier work [6]. One channel is used for experiments, the second channel represents a control sensor. Each channel has 15 ml of water in Dewar vacuum flask with NTC thermistor immersed in the fluid. Additionally, the air temperature is monitored in each section of the calorimeter inside and outside of the thermo-insulating box. Stabilized power supply is also measured by a separate sensor, the delta-sigma ADC with 24 bit sampling is used. In this work we utilize a passive scheme for the calorimeter, where a slow temperature variation is provided by a circadian rhythm in the laboratory (about 1-1.5 °C for 24 hours) and guaranties a high degree of homogeneity in temperature distribution. Differences caused by changes in the heat capacity of water samples are measured as symmetry breaks between channels, small fluctuations about 10^{-5} °C of relative temperature can be detected. This system is used to explore the heat capacity of para- and ortho- isomers of water [25]. In several experiments we use electrochemical impedance spectrometers [30] to detect effects on environmental sensors, see Fig. 7.