

**Authors:**Tissari, J., Lamberg, H., Leskinen, J., Sippula, O., Jokiniemi, J.

University of Eastern Finland, Department of Environmental and Biological Sciences, Fine particle and aerosol technology laboratory, P.O. Box 1627, FI 70211, Kuopio, FINLAND

**Title:**A novel concept for studying sauna stoves

**Abstract:**A novel concept for studying the conditions in sauna has been built at the University of Eastern Finland during 2017. Parameters under examination include temperatures, relative humidity, ventilation alternatives and calculation of energy balance and energy efficiency of the sauna room. The concept is following the typical Nordic way of building and the condition in sauna represent the real-life conditions. The special focus of the project is given to the fine particle and gaseous emissions that are emitted from wood-fired saunas. The concept is equipped with of real-time instruments, including carbon monoxide (CO), total hydrocarbon (THC), nitrogen oxide (NO), black carbon i.e. soot (BC), particulate mass (PM) and number (PN). In addition, samples for particle chemical composition (e.g. polycyclic aromatic hydrocarbons (PAHs)) are collected. Measurement of indoor air quality in sauna room is also possible. Furthermore, ventilation air flows can be controlled and measured independently. The results will be used e.g. in the development of low emission sauna stoves, defining the standard testing method for operation of sauna rooms and in the emission inventory studies. It is also possible to measure and define the optimal sauna conditions for the humans inside.

**Key words:** wood combustion, sauna stoves, emissions, fine particles, indoor air, ventilation