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# Investigation of the spectral responses of laser generated aerosol from household coals using a state-of-the-art multi-wavelength photoacoustic spectrometer

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We present the investigation of the inherent, spectral features of laser generated and chemically characterized residential coal aerosols generated in our recently introduced laser ablation based LAC generator. The optical absorption and the scattering features of the generated aerosol were investigated by our state-of-the-art multi wavelength PAS instrument (4$\lambda$-PAS) and a multi wavelength cosinus sensor (Aurora 3000). The quantified wavelength dependency (AAE and SAE) are deduced from the measured data. Finally, relationship between the optical and the thermochemical characteristics is revealed.

Atmospheric light absorbing carbonaceous particulate matter (LAC) is in the middle of scientific interest especially because of its climatic and adverse health relevance. The latest scientific assessments identified atmospheric soot as the second most important anthropogenic emission regarding its climatic effect and as one of the most harmful atmospheric constituents based on its health aspects. LAC dominantly originates from anthropogenic sources, so its real time and selective identification is also essential for the means of its legal regulation. Despite of its significance the inherent properties of LAC are rarely described and the available data is widely spread even in the case of the most intensively studied black or elementary carbon. Therefore, the investigation of the inherent climate and health relevant properties of atmospheric soot is a highly actual issue. Moreover investigation of the optical and toxic properties of LAC originating from the combustion of household coals is almost completely missing from literature. There are two major reasons for that. Firstly, the characteristic parameters of soot are complex and vary in a wide range and depend not only on the initial burning conditions and the type of fuels but also the ambient factors. The other is the lack of a soot standard material and a generator which are suitable for modelling the real atmospheric black carbon and making the controlled generation of real atmospheric soot particulate possible. The most commonly used and commercially available methodologies only partially fulfil these requirements; therefore introducing alternative, improved methodologies is a highly relevant scientific goal.