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LIBS in a low temperature plasma for the detection of airborne asbestos

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Forbidden in french constructions since 1997, asbestos remains present in most of the buildings constructed before this date. Thus, during work or in case of degradation, asbestos fibres can be emitted in air. The smaller the asbestos particles, the longer they stay in suspension in air, increasing the hazard of inhaling them.

The current determination of airborne asbestos presence in France follows a long and cumbersome normative protocol (NF X 43-050), with an analysis carried out on a Transmission Electron Microscope at laboratory after air filtration on-site. Such a protocol induces wasting time between the sampling and the results delayed not less than 48 hours and therefore prevents for the intervention on-site-on-time. Thus, the demand of a real-time measurement increases, even if it is only an alert technique.

The PLASMIANTE project aims to develop an apparatus able, on-site and in near-real-time, to analyse the particles present in an air sample and to identify the presence of asbestos. The device will sample air and send the particles in a reactor in which they will be trapped in a low-temperature argon plasma. Among several diagnostics that will be applied directly on the particles in suspension in the plasma, Laser Induced Breakdown Spectroscopy will be used to identify the presence of asbestos in the samples.

In this study, we present the first results of LIBS applied to particles of asbestos, building materials and mixtures in suspension in a low temperature plasma.

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