

Optimised gating for detecting chlorine and fluorine in molecular form using microwave LIBS

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ABSTRACT

Microwave assisted laser-induced breakdown spectroscopy (MW-LIBS) has been applied spectroscopically to detect chlorine and fluorine at ambient conditions. Chlorine and fluorine have been detected using strong molecular emission band of CaCl and CaF at 617.9 nm and 605 nm respectively. The detector's gate-delay has been optimised to achieve the optimum signal to noise (SNR) of CaCl and CaF molecular emission. Results show, using a constant gate-width of 300 μ s, the highest SNR of CaCl and CaF can be achieved at gate-delay of 500-1000 and 400 ns respectively. It was found that the MW-LIBS enhances the CaCl and CaF signal up to 4.5 and 8 times respectively compared with LIBS. The SNR improvement was 2.5 times for both bands.