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Detection and quantification of sulfur in oil products by laser-induced breakdown spectroscopy for on-line analysis

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Determination of sulfur in petroleum products is described using Laser Induced breakdown spectroscopy (LIBS). A study of buffer gases employed to improve sulfur IIR line detection is presented. Optimisation of the flow rate led to a 1.4 L/min optimal Helium flow rate. An adaptation between a typical laboratory setup to a compact system allowed to obtain detection limits in the 0.2% w/w range. Calibration is made under the process conditions (70°C) and at room temperature. Normalization with a helium emission line compensates for liquid level variations and for the temperature variations. The analysis of a sample over the course of two days under the conditions of the industrial process was tested and gave a good repeatability.