## Dear Partners
**A New and Upgraded Website.**

We always aim at staying on top of the high-tech world, and for that we provide our customers with all the elemental analysis solutions in one place expand our distributor's network and improve our foothold in internet. We thus make all the available knowledge about our technology accessible to all.

We recently put a lot of thought into improving our website and making it even more user-friendly by adjusting it to all the latest market requirements, hoping to make the browsing experience at **www.xenemetrix.com** as effective and pleasant as possible.

Our website now contains more images, additional links and the information more streamlined and easier to access.
For example, if you are looking for the best elemental analysis solution, just browse our applications page, find the right topic for the analytical task, enter and read about the EDXRF technological advantages, and the right equipment for the specific job will be presented.

Enjoy browsing through our website at **www.xenemetrix.com**

For more information please contact us at: **info@xenemetrix.com**

Yours,
**Xenemetrix Team**

## Tip of the Month

**Ultra low Sulfur**

Sulfur is the 16th element in the periodic table, and is symbolized by the chemical symbol S. It constitutes an important mineral in the human body and is widely used in the industry. The fuel industry in particular, imposes strict regulations to ensure the existence of low quantities of Sulfur in fuels.

Since Sulfur is a light element (low atomic mass) the following specified acquisition parameters should be used in the analysis: no filter; the voltage and current used should be low and according to the matrix (diesel, water, oil, plastic etc). For the S-mobile ULS system the recommended analysis for Sulfur in diesel is 7-9 kV and 1000-2000 uA, and the spectrum acquiring time recommended is 300 sec or more. At very low Sulfur quantities air atmosphere interferes with the analysis, and therefore vacuum for solid and Helium purge for liquid samples should be used. Energy range of 40 KeV can be used if other elements with higher Z (Atomic number) need to be detected, but for Sulfur alone 10 KeV range is preferred. The SDD detector processes data faster by using the high output.

**The new S-mobile ULS portable system is now available by Xenemetrix.** The system detects most elements and specializes at detecting ultra-low quantities of Sulfur (the limit of detection is 0.18 ppm for Sulfur in diesel) with excellent accuracy and precision.

More tips & support please contact us at: **info@xenemetrix.com**

## Application Highlight

**Quantitative analysis of ultralow Sulfur in diesel**

EDXRF is an ideal method for a quick and simple elemental analysis test for industrial control purposes. This analytical technique is quick, noninvasive, requiring minimal sample preparation, and can easily be operated by non-skilled personnel in the production line. The S-Mobile ULS is a low-cost, small and compact benchtop analyzer with the ability to measure Sulfur at very low concentrations. Minimum detection limits at 3sigma is 0.5ppm, which allows for quantitative analytical measurements from a few ppm and up.

In the petrochemical industry, where the lowering of Sulfur in different products is constantly subject to more and more stringent restrictions, the Xenemetrix S-Mobile allows for a safe and simple analysis of Sulfur in fuel products. For example, the current "Euro V" standard specifies a maximum of 10 ppm of Sulfur in diesel fuel for most highway vehicles. Monitoring fuel at 10 ppm and less requires low minimum detection level, which is one of the most prominent characteristics of Xenemetrix S-Mobile ULS, equipped with a highly efficient silicon drift detector and a special Ag anode x-ray tube.

**Experimental:**
Five certified calibration standards for analysis of Sulfur were used to calibrate the S-Mobile for detecting Sulfur in diesel. Sample acquisitions were performed using Helium purge. Helium is required for replacing Oxygen in the air that will otherwise absorb the low energy signal from Sulfur.

**Quantitative results:**
A calibration curve was built based on the spectral data of the five calibration standards. Spectra are shown in Figure 1 and the calibration correlation graph is shown in Figure 2. A static precision experiment was run on a 5ppm sample. Ten consecutive spectra were acquired on the 5ppm sample without moving it in between runs. The results, i.e. the average concentration measured ± 1 standard deviation and 1 relative standard deviation determined were: 5.4ppm ± 0.4ppm rsd=7.3%. The results are presented in Table 1. of accuracy obtained.
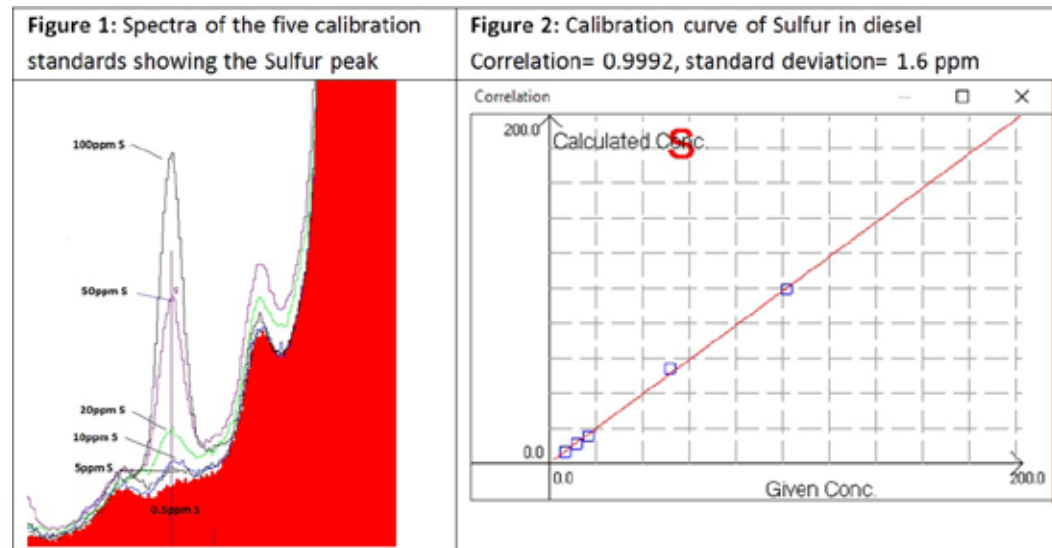


Figure 1: Spectra of the five calibration standards showing the Sulfur peak

Figure 2: Calibration curve of Sulfur in diesel
Correlation= 0.9992, standard deviation= 1.6 ppm

**Table 1: Precision on a 5ppm S in diesel sample . Average value measured 5.4ppm ±0.4ppm; rsd=7.4%**



| # | Station | Sample | Procedure | Element | Counts | Intensity | Concentration | Units | Comments |
|---|---------|--------|-----------|---------|--------|-----------|---------------|-------|----------|
| 1 | 0 | ULS5_1 | ULS-2 | S | 184747 | 40.28 | 5.3099 | ppm | |
| 2 | 0 | ULS5_2 | ULS-2 | S | 184453 | 39.67 | 5.2939 | ppm | |
| 3 | 0 | ULS5_3 | ULS-2 | S | 184180 | 40.32 | 5.9463 | ppm | |
| 4 | 0 | ULS5_4 | ULS-2 | S | 183016 | 31.61 | 4.6856 | ppm | |
| 5 | 0 | ULS5_5 | ULS-2 | S | 183352 | 45.06 | 5.7306 | ppm | |
| 6 | 0 | ULS5_6 | ULS-2 | S | 183068 | 40.23 | 5.3364 | ppm | |
| 7 | 0 | ULS5_7 | ULS-2 | S | 182704 | 42.57 | 5.5125 | ppm | |
| 8 | 0 | ULS5_8 | ULS-2 | S | 182800 | 35.33 | 4.9666 | ppm | |
| 9 | 0 | ULS5_9 | ULS-2 | S | 183291 | 45.98 | 5.7699 | ppm | |
| 10 | 0 | ULS5_10 | ULS-2 | S | 181580 | 36.46 | 5.0517 | ppm | |

**CONCLUSION:**
This short report demonstartes the remarkable ability of Xenemetrix S-Mobile ULS to measure Sulfur in diesel at very low concentrations, and thereby its outstanding potential of monitoring Sulfur content in petrochemical products, such as fuel. The excellent performance and ease-of-use make the Xenemetrix S-Mobile ULS the method of choice to ensure that all stringent requirements of Sulfur limits in different fuel products are met.

For the full report and more details please contact us at: **info@xenemetrix.com**

**Coming Next:** New Applications, Tips & Innovations