HIGH EFFICIENCY SAMPLE INTRODUCTION NEBULIZER

TECNOLOGÍA PATENTADA

LICENCIADA EN EXCLUSIVA

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RESUMEN

A new high efficiency nebulizer has been developed in collaboration between two Spanish universities and a spin-off company. It is called Flow Blurring Nebulizer (FBN) and is a nebulizer for inductively coupled plasma (ICP) that incorporates the latest technologies and materials. Due to the microfluidic principles, the FBN has proved to be the best existing nebulizer for sample introduction in ICP applications. Researchers are interested in sell the new nebulizer to final customers or companies.

VENTAJAS Y ASPECTOS INNOVADORES

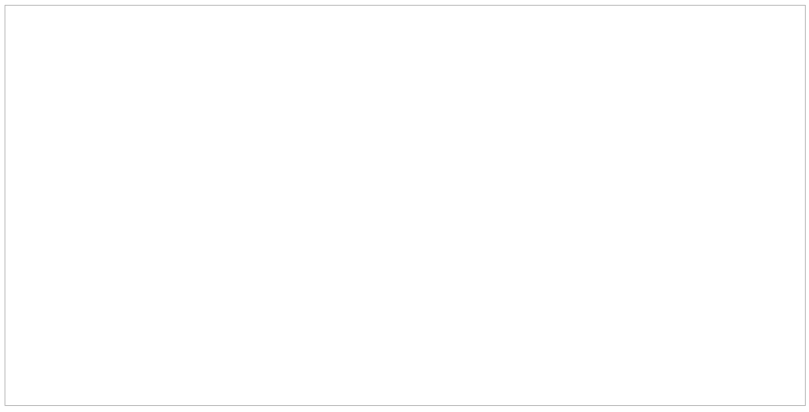
INNOVATIVE ASPECTS

In recent years, the superiority of the prototypes made by the company over current nebulizers has been established by different articles published in prestigious scientific journals. However, our research program went further on, incorporating improved engineering solutions that have finally culminated in the design of the Flow Blurring Nebulizer, the best nebulizer ever made for liquid sample introduction in ICP-based analytical spectroscopy instrumentation.

The FBN has successfully surpassed every conventional nebulizer that has been compared with. Furthermore, the FBN improves the results obtained by micronebulizers in their optimal parametrical range.

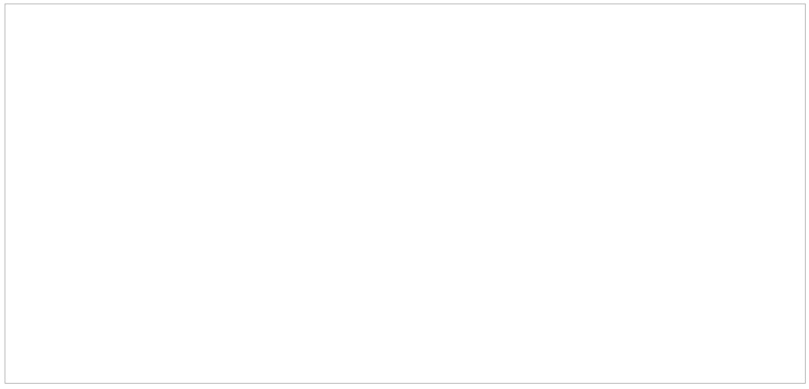
As shown in the Figure 4, while other evaluated micronebulizers generate a very high proportion of big droplets (bigger than 20 microns), most of the droplets generated by the FBN are below 10 microns, due to its high energetic efficiency. Hence, under identical working conditions the FBN generates a much finer and monodisperse spray, which means to introduce more sample mass in the plasma and considerably enhance the sensibility and detection limit of the analysis.

- Drop size distribution.

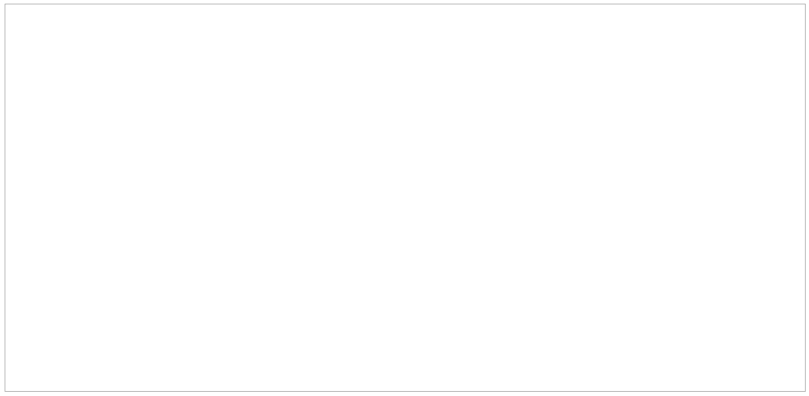


- Figures of merit.

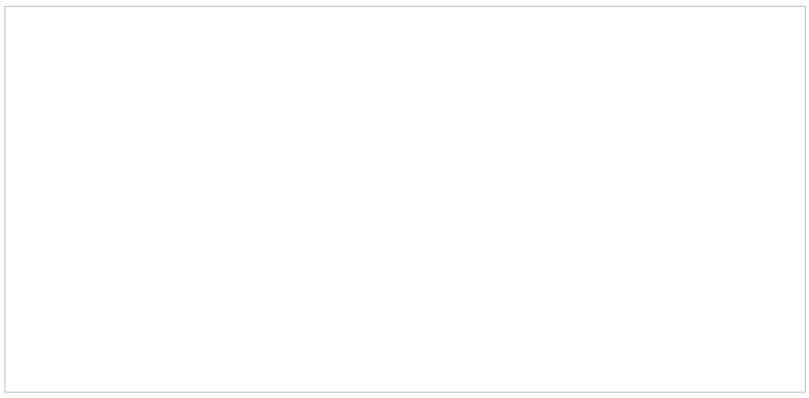
The FBN has been tested and compared, under similar conditions, with other common micronebulizers and has reached sensibility levels up to three times higher (Figure 5).



Relative standard deviation values obtained with the FBN are also improved (Figure 6).



Both improvements shown by the FBN are finally reflected in a clear improvement on limit of detection values (LOD) (Figure 7).



The main innovative aspects include: high atomisation efficiency (most of droplets below 10 microns), the technology allows the user to reach stable regimes from flows as low as 0.005 mL/min up to 3 mL/min, high transport efficiencies, high sensibility, good performance with high salt content solutions and no high pressure needed for its operation.

It will soon become an indispensable tool in every analytical spectroscopy lab devoted to inorganic elemental analysis.

MAIN ADVANTAGES

1. High atomisation efficiency (most of droplets below 10 microns).
2. High transport efficiencies (around 30%) introducing up to six times more samples than common nebulizers.

3. The technology developed allows the user to reach stable regimes from flows as low as 0.005 mL/min up to 3 mL/min.
4. High sensibility levels working with low flows. Sensibility levels three times higher than commercial nebulizers.
5. Excellent performance with high salt content solutions.
6. Chemical compatibility with samples, including samples with HF, etc.
7. No fragile device and no high pressure needed for its operation.
8. Fitting compatibility of the nebulizer.
9. Better behaviour than other commercial nebulizers.

APLICACIONES DE LA OFERTA

This system may be used by all the laboratories devoted to elemental inorganic analysis based on plasma instrumentation (ICP-AES and ICP-MS). It could be useful in such areas as environmental (drinking water, ambient water, sea water, soils, sludges, solid waste, elemental speciation), food analysis (QA/QC), semiconductor (process chemicals, contaminants in Si wafers, photoresists and strippers), clinical (blood, hair, serum, urine, tissues), forensics (gun shot residue, materials characterization, point of origin, toxicology), geological (soil, rocks, sediments, isotope ratio studies, laser sampling), nuclear (fuel production, measurement of radioisotopes, primary cooling water) and general chemical industry (R&D, QA/QC).

COLABORACIÓN BUSCADA

The cooperation is sought to sell the new nebulizer to final customers or companies interested. Other collaborations regarding the exploring of new applications and specific studies to use the new nebulizer are also sought.