

## **Synergy of multi-element single particle ICP-TOFMS and field-flow fractionation for the analysis of complex samples**

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Multi-element single particle inductively coupled plasma mass spectrometry (SP-ICP-MS) with a time-of-flight mass analyzer has many advantages for the analysis of composite particles and complex samples. Recent application examples [1-3] demonstrate that the technique is a valuable addition to the nanolytics tool box and can make a significant contribution to solving complex environmental problems.

ICP-MS provides not a “true” particle size, but a diameter equivalent to the element mass measured in a given particle. Due to poor detection power of ICP-MS for non-metals, information on the complete particle composition is not accessible. Therefore, SP-ICP-MS cannot distinguish between e.g. pure metallic particles, oxides, or a large agglomerate of a nanoparticle and organic matter.

Hyphenation of multi-element SP-ICP-MS with separation techniques such as field flow fractionation would help to get independent information on particle sizes and minimize the effect of dissolved ions on single particle detection limits.

In this contribution, we describe analytical capabilities of the TOFWERK icpTOF coupled to Postnova asymmetric flow field-flow-fractionation. Selected application examples, including well-characterized synthetic particles, particulate steel extracts and water samples will be presented.

[1] Praetorius, A., *et al.*, Environmental Science: Nano, 2017, 4, 307-314.

[2] Gondikas, A., *et al.*, Environmental Science: Nano, 2018, 5, 313-326.

[3] Hendriks, L., *et al.*, JAAS, 2017, 3, 548-561