Halogen analysis at the ultratrace level – first applications of the Dresden Super-SIMS

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The integration of an ion source having very high spatial resolution with a tandem accelerator is a long-standing concept for improving analytical selectivity and sensitivity by orders of magnitude [1]. Translating this design concept into reality has its challenges [e.g. 2,3], meaning this approach has seldom be used in the framework of geochemical research [e.g. 4].

Supporting a strong focus on natural, metallic and mineral resources, the Helmholtz Institute Freiberg for Resource Technology installed a so-called Super-SIMS at the Ion Beam Center at HZDR; this highly novel tool is devoted to the characterization of minerals and ores. The secondary ion beam from a CAMECA IMS 7f-auto is injected into the 6MV Dresden Accelerator Mass Spectrometry [5] facility, which quantitatively eliminates effectively all molecular species from the ion beam.

We will present the current status of this initiative and will report on the performance parameters of the Dresden Super-SIMS as well as first results from halogen determinations in sphalerite and galena. Furthermore, we will describe our concepts for the quantification of these data at the ultratrace level.

[1] Matteson (2008) *Mass Spec Rev* **27,** 470-484. [2] Ender *et al.* (1997) *NIMB* **123** 575-578. [3] Fahey *et al.* (2016) *Anal Chem* **88**, 7145-7153. [4] Sie *et al.* (2000) *NIMB* **172**, 228-234. [5] Rugel *et al.* (2016) *NIMB* **370** 94-100.