

Digestion with nitric acid or aqua regia?

ALS Scandinavia currently offers accredited analyses of soil, sludge and sediment after extraction with nitric acid for metals. In agreement with the Swedish Environmental Protection Agency's guidelines, ALS Scandinavia also offers accredited measurements of Ag, Mo, Sb and Sn in soil and sediment after extraction with aqua regia. Treatment with aqua regia improves the extraction efficiency for the majority of elements and can thus increase the applicability of the analytical results. In recent years, ALS Scandinavia has seen an increasing trend in requests for results obtained using aqua regia extractions. We have therefore chosen to expand our existing accreditation with respect to elements and sample matrixes.

Why digestion with aqua regia?

In countries outside of Scandinavia, it is more common to extract environmental matrices with aqua regia, than with nitric acid alone. For easily-leachable elements and organic matrices like sludge, it is of minor importance which method of treatment is chosen. On the other hand, for other matrixes and elemental groups, the choice of extraction method may be crucial. Aqua regia is more aggressive and can thus increase the leaching fraction of certain elemental groups. Since aqua regia, as opposed to nitric acid, also contains a complexing agent, this can significantly increase the extraction efficiency.

For analyses of hazardous substances released from construction materials, a new European standard is in progress. This standard specifies extraction with aqua regia, and therefore ALS Scandinavia can already provide customers with the analyses that will be required to meet European requirements in the near future.

For a representative homogenous soil sample with a low degree of pollution, the exchange of metals can increase by a factor of between 1.1 and 10 for a number of selected elements. The largest increase is seen for lithogenic elements such as Ti, but also Sn and Sb exhibit factors exceeding 5. On average, the increase is between 2 and 3 for environmentally relevant elements. For a number of easily-leached elements, the extraction efficiency will remain unchanged.

ALS Scandinavia has therefore chosen to extend its' accreditation for aqua regia digestion with respect to element coverage and sample types. ALS Scandinavia's accreditation will after the expansion cover 59 elements in soil, sediment, sludge, ashes, construction materials and waste samples. A complete list of the elements included and corresponding reporting limits may be found on our website: www.alsglobal.se/en (type "aqua regia" in the Full search field in the Search analysis box).

Digestion with aqua regia follows the below mentioned standards:

- SS-EN 13346 (sludge)
- SS-EN 13657 (waste)
- SS-EN 16174: 2012 (sludge, treated biofuel and land)
- SS-ISO 11466 (land)

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