Precise determination of dissolved silicon in seawater by standard addition ICP-QMS/QMS after magnesium hydroxide coprecipitation using an automatic coprecipitant feeder

YANBEI ZHU[1] AND TONGXIANG REN[2]

[1]National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, 1-1-1 Umezono, Tsukuba, Ibaraki 305-0032, Japan. (yb-zhu@aist.go.jp)

[2]National Institute of Metrology, No. 18, Beisanhuan Donglu, Chaoyang District, Beijing 100026, P. R. China. (rentx@nim.ac.cn)

Dissolved silicon is one of the important nutrients in seawater and an indicator of the water mass. Inductively coupled plasma mass spectrometer (ICP-MS) is a powerful instrument for elemental analysis, but seawter is often a challenging sample because of the high concentrations of salt contents, *ca*. 3.5 %.

Zhang et al. (2014) have reported that hydroxide coprecipitation with the natual magnesium contents (*ca*. 1100 mg L^{-1}) in seawater is an effective method for the separation and the enrichment of dissolved silicon for its measurement by ICP-MS. In the present work, an automatic coprecipitant feeder was developed and applied to the magnesium hydorxide coprecipitation for the separation of dissolved silicon in seawater.

Optimization of the qantity of the precipitant was carried out to achieve the best recovery of dissolved silicon. The blank test and the recovery test were carried out in the same way as the seawater sample.

In the present experiment, measurement of silicon isotopes were carreid out using an Agilent 8800 ICP-QMS/QMS instrument, *i.e*. an ICP-MS with two tandem quadrupole mass spectrometers (QMSs) and an octapole reaction cell (ORC) system. Spectral interferences with the silicon isotopes were effectively removed by the ORC system. Furthermore, standard addition was applied to the measurement of silicon by ICP-QMS/QMS to eliminate the matrix effect of magnesium.

In the presentation, the detailed results will be reported as well as the mechanism and the structure of the automatic coprecipitant feeder.

[1] A. Zhang et al. (2014) *J. Anal. At. Spectrom*., **29**, 2414-2418.