Risk-management study of trace elements in deep-sea water and salt products using the non-destrucitve PIXE method

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In Tokyo Institute of Technology Van de Graaff laboratory, high-resolution Si(Li) detector was newly installed to set up the advanced X-ray detection system consisting of two sets of Si(Li) detectors and the rotation sample holder which can set 12 samples. In the present study, simultaneous multi-elemental analysis towards development of trace elements management of salt products was carried out using this advanced X-rays detection system. Insoluble constituents were collected by percolating through the Nuclepore Track-etch Membrane filter of pore diameter 0.4μm. The effluent was spiked by Mo(VI) as the internal standard, and then heavy metals were collected by complexation with dibenzyldithiocarbamate (DBDTC) on the membrane filter. In these procedures, matrices of NaCl could be effectively removed to determine more precisely heavy elements. These filters were irradiated by 2.5MeV proton beam for PIXE spectrometry. These analyses of salt products showed that the insoluble constitutents in salts were calcium silicates or aluminosilicates containing As and/or Pb, heavy metals and alkaline earth metals. The level of arsenic content was below the concentration standard proposed by the Sio Kogyo Kai, but some of other salt products showed higher level of arsenic concentration. Thus, the solid-state multi-elemental X-ray analysis by PIXE was effective for risk management of heavy metals in salt products.