

Analysis of Sea Salts

Subtitle Determination of Al, B, Ba, Fe, Mn, Sr and Zn in Solar Salts by ICP-AES

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Summary

This work describes the applications of inductively coupled plasma atomic emission spectrometry (ICP-AES) in conjunction with standard addition method to the determination of Al, B, Ba, Fe, Mn, Sr and Zn in solar salt samples. The samples were directly analysed without any preconcentration technique of desired elements.

A 25.0g amount of solar salt sample was dissolved with 100ml of distilled water in a beaker, and subsequently 5ml of concentrated nitric acid was added. After covering the beaker with a watch glass, the mixture was heated on a hot plate for 30min at 100 °C. After cooling, the solution was filtered through a filter paper then diluted with distilled water in a 250ml calibrated flask. A 50ml aliquot of the original sample solution was spiked adequately with each desired element and then diluted to 100ml with distilled water. Each solution was analyzed twice to establish the standard curve. The NaCl as matrix resulted in the same decrease in emission intensity for each element. This effect can be explained as follows; variations in the NaCl concentration lead to a variations in the viscosity, which influence the transport properties of the sample into the ICP. The standard addition method should be used to avoid any interferences from variation of NaCl concentration. Most elements show a relative standard deviation of better than 10% at several ppm level in the sample. The determined amounts of Ba and Sr in the samples were 0.3 - 10 and 37 - 54ppm respectively. Strontium results agreed well with previously reported values. Furthermore, the Mn and Zn concentrations in Australian solar salt found here compare well with those reported elsewhere. It is interesting to note the considerable differences in the Al, B, Fe and Mn contents between the Chinese solar salt and other countries' solar salts.