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Determination of molybdenum using ESR method

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Abstract:
A molybdenum (Mo) thiocyanate complex, $Mo(SCN)_5$ had been used previously for the determination of Mo in seawater using electron spin resonance (ESR) method. In the present ESR study, a reduced Mo complex with diethyldithiocarbamate (DDC), Mo-DDC, was extracted with cycohexanol and used for the determination of Mo. Mo-DDC shows a peak at g = 1.980 with peak-to-peak width of 0.3 mT, whereas $Mo(SCN)_5$ shows a peak at g = 1.940 with peak-to-peak width of 1.2 mT. DDC reacts with Mo more specifically than SCN^-: The peak height of Mo-DDC is nearly 30 times that of $Mo(SCN)_5$ produced from the solution containing both DDC and SCN^- with the molar ratio of DDC: SCN^- = 1 : 30. The limit of detection and the time required for measurement are 0.1 ng and 5 min, respectively in the present method, whereas those are 5 ng and 60 min, respectively in the previous SCN method.

Key words: molybdenum, diethyldithiocarbamate, thiocyanate, stannous chloride, electron spin resonance

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