Development of a Simplified Separation and Identification Method of Metallic Ions by Using High Voltage Ionic Migration

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To separate and identify metallic ions, precipitation and filtration should be repeated. Furthermore, many kinds of reagents should be used and operations are complicated. A new method for separation and identification of metallic ions has been developed by using high voltage ionic migration. Filter paper for chromatography and an electric source that provides 300 V were used for experiments. An aqueous solution of a metallic salt was spotted on a piece of filter paper containing an Na2SO4 solution which produce hydroxide ions around a cathode by electrolysis, and the high voltage was applied. A half circular band consisted of hydroxide precipitates was formed at a position which depended on the metallic ions. This phenomenon has not been observed when the low voltage is applied. The distances from the spot to bands were characteristic for each metallic ion, thus the values can be used to identify the metallic ions. The ratios of the distances to the largest one are in the range of 0.69-0.95. The differences are due to those of mobility of metallic ions caused by the electric charges and the masses of hydrated ions. For the mixture of metallic ions, each ion can be assigned using the position of migration at the time of band formation of the fastest metallic ion. This procedure is superior to the conventional one because it needs small amount of sample and is easy to handle. This method is expected for new identification procedure of metallic ions in the future.

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