INVESTIGATION OF POLAROGRAPHIC INTERFERENCE BETWEEN Se(IV) AND As(III), ITS ELIMINATION AND APPLICATION FOR THE TRACE DETERMINATION OF As(III)

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For the determination of trace elements among many methods, electroanalytical methods are preferred because of their sensitivity and selectivity feature. In our differential pulse polarographic (DPP) study for the trace element determination, we found strong interference between selenite and some ions, such as copper, lead, cadmium, zinc, and chromium.

Their DP polarographic peak decreased by the addition of selenite and a new peak appeared. The same behavior was observed when these ions were added into a solution containing selenite.

This kind of interference was observed in all acids and in wide range of pH values, causing at least 50% error when both ions (the ion present and selenite) were in similar quantities. Thorough investigation revealed formation at the mercury electrode surface of an intermetallic compound between selenium and the elements present [1-3].

Because of this kind of interference, its elimination is very important. It was found the new peak formed could be used for the determination of one ion in the presence of large amounts of the second ion.

During our polarographic studies for the determination of arsenic, strong interference was observed when selenium was present in the same solution, which made their correct determination impossible. This fact is very important, since both of these ions may be present with great probability in the same sample. However, our further studies have shown that this interference can be used for the determination of As(III) and Se(IV) using the new peak formed in the presence of both of these ions.

We found that in the presence of 6 or 10 times of Se(IV) 10⁻⁶M As(III) could be determined with great accuracy. On the other hand for the determination of 10⁻⁷M As(III) the selenite added had to be larger. Similar situation was obtained for selenite determination by the addition of larger amount of arsenic.

References