

RECENT APPLICATIONS OF CARBON PASTE ELECTRODES IN POTENTIOMETRY AND STRIPPING ANALYSIS

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The contribution deals with recent applications of carbon paste electrodes in both equilibrium potentiometry and stripping analysis using both voltammetric and potentiometric modes.

With respect to potential measurements in an equilibrium state, the carbon paste electrodes - from the viewpoint of their composition - may be classified as ion-selective liquid membrane type electrodes: pasting liquid exhibit usually good extraction ability against ion-associates composed of lipophilic species. When compared with ion-selective electrodes based on polymeric membranes, the carbon paste electrodes offer an advantage of much lower Ohmic resistance and very quick response time, which is especially appreciated in automated titration modes. As shown in our recent studies, these carbon paste-based potentiometric sensors may be applied in all procedures developed for liquid/polymeric membrane-based electrodes. For example, the very recent applications involve the determination of trivalent thallium or elements forming heteropolyanions.

Some new types of carbon paste electrodes containing more polar organic liquids, often used as plasticizers of polymeric membrane-based electrodes, were introduced recently by our group and applied for accumulation of some lipophilic ions followed by stripping analysis using both voltammetric and potentiometric modes. It was shown that in acidic media, these pasting liquids may act as anion exchangers due to the presence of some protonizable functional groups. Thus, for example, a carbon paste electrode containing tricresyl phosphate was found to be suitable for accumulation of some lipophilic anions

forming corresponding ion-pairs with the protonized pasting liquid. Carbon paste electrode chemically modified with cobalt(II) phthalocyanine was applied for voltammetric determination of ascorbic acid in foodstuffs.

Carbon paste electrode containing silicone or paraffin oil as the pasting liquid were also found to be suitable support for mercury or gold film in stripping analysis of heavy metals and arsenic. It was confirmed that carbon paste is able to offer very similar results as the well established glassy carbon electrode and, in addition, easy and inexpensive carbon paste electrode preparation and no risk of mechanical damage of the electrode material is very advantageous. Finally, it was shown that the mercury film with properties similar to those of a mercury film generated from solution may be obtained by reduction of HgO used as a modifier.