LETTER

A New Type Mercury Electrode for Polarography

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A new type mercury electrode has been designed for polarography. As shown in Figure 1, this electrode has a pin hole of which the diameter is so small that the mercury does not drop through the hole due to the large surface tension of mercury. The mercury is always kept on a suitable constant head level and poured at a slow steady speed. This electrode retains many of the

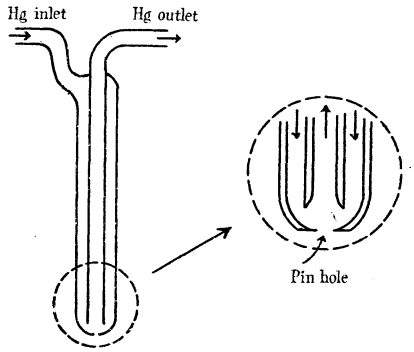

Fig. 1.

advantages of conventional procedures and has about the same sensitivity as compared with the dropping mecury electrode. The polarograms obtained by using this electrode are very smooth and the residual currents have noticeably less slope than those of Heyrovsky-Forejet's streaming mercury electrode.[1] For instance, the polarograms of air-free 0.1 N KCl solutions containing 5×10^{-4} M $CdCl_2$ and gelatin as a maximum suppressor give an experimental relation $h=45A+0.02$, where h is the wave-height(μA) and A is the sectional area(cm^2) of a pin hole of this type electrode. The residual currents, however, are always about 0.05 μA at —0.6 V in the above cases.

If a pair of this type electrode which has the same characteristics are used in a polarographic circuit, the residual currents may be almost completely eliminated. (The one electrode is immersed in the solution containing samples to be analysed and supporting electrolytes and the other electrode is immersed in the solution containing supporting electrolytes only.)

Thus, the electrode of this type will be well applied to the oscillographic polarography, the derivative and differential polarography, the potentiometric plot polarography, the amperometry and so on.

1) *Z. physik. Chem.*, **193**, 77 (1943).

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