

## TWO STATES OF HYDROGEN ADSORBED ON RHODIUM

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In distinction from Pt and Ir in 1 N  $H_2SO_4$ , which give two waves in the hydrogen region of current vs potential ( $\varphi$ ) curves, there is only one wave in the case of Rh and the symptoms of hydrogen adsorption in the second state are missing [1]. When analyzing estance vs potential curves on Pt and Ir it was established that at small and medium surface coverage the contribution of the second state of adsorbed hydrogen ( $H_m$ ) to surface tension is small in comparison with the contribution of the first state ( $H_e$ ) [2]. Therefore, the  $H_m$  adsorption region appears on estance-potential oscillograms as an estance drop. On Rh in 1 N  $H_2SO_4$  a sharp estance drop is observed at  $\varphi < +0.07$  V (against the hydrogen electrode). The independence of the rhodium electrode estance in the hydrogen region of  $\varphi$  from frequency (1-54 kHz) and  $H_2SO_4$  concentration (1 N to 15 N) shows that at low  $\varphi$  only the hydrogen adsorption process is responsible for the estance. Thus the estance data indicate that hydrogen adsorption on Rh in the second state starts at 0.07V.

The effect of internal transition  $H_e \rightleftharpoons H_m$  was also observed on Pt and Ir when varying  $\varphi$ . It is caused by overlapping of the adsorption regions  $H_e$  and  $H_m$ : the existence of a  $\varphi$  region (near +0.1 V against the hydrogen electrode) where at the same time both coverages are far from the limiting values (0 and 1). The effect of  $H_e \rightleftharpoons H_m$  on Pt and Ir corresponds to an estance peak, increasing sharply with increasing frequency. Such a peak is not observed on Rh; i.e., on Rh the adsorption regions  $H_e$  and  $H_m$  do not overlap. These results are in agreement with the conclusion made in [3] that the negative sign is preserved in the contribution of H to the dipole potential jump on Rh, since the data in [3] were obtained in the region  $\varphi > +0.05$  V (against the hydrogen electrode), where there is yet practically no  $H_m$  adsorption.

## LITERATURE CITED

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