

Adsorption of Methanol on PtRu/C nanoparticles at OCP  
studied by DEMS

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The kinetics of methanol adsorption on PtRu/C nanoparticles embedded in a membrane electrode assembly of a fuel cell has been studied in the temperature interval between 30 °C and 110 °C.

Adsorption was carried out at OCP (~ 20 mV vs RHE). The adsorption isotherms were of Temkin type yielding an adsorption rate constant of  $k_{ad} = 1,05 \text{ cm}^3 \text{ mol}^{-1} \text{ s}^{-1}$  (at 30 °C). The apparent activation energy amounted to  $E_A = 44,6 \text{ kJ/mole}$ . The interaction parameter  $\alpha_f$  was found to decrease with increasing temperature.

By means of DEMS the nature of the stable adsorption product has been determined. Above the oxidation onset potential, exclusively CO was found.

The H coverage was calculated from the  $H_{upd}$  desorption charge. The relative quantity of H which could be desorbed after methanol adsorption was higher than the relative H desorption charge obtained after adsorption of CO. This effect was more pronounced towards lower temperatures and adsorbate coverages.