

Poster Abstracts

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Hydrogen transport through nickel hydroxide electro-deposited films

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Hydrogen transport through electro-deposited nickel hydroxide films containing various fractions of cobalt hydroxide has been investigated by analysing build-up and decay current transients under the application of large (70 to 400 mV) and small (10 mV) voltage steps. The velocity and mobility of the phase boundary movement upon hydrogen extraction were determined to be in the order of $10^{-6} \text{ cm s}^{-1}$ and $10^{-5} \text{ cm s}^{-1} \text{ V}^{-1}$ in magnitude, respectively. It is concluded that $\beta\text{-Ni(OH)}_2$ phase is stabilised by the Co(OH)_2 incorporation into the Ni(OH)_2 film and hence both the velocity and mobility of the NiOOH/Ni(OH)_2 phase boundary movement is raised by the Co(OH)_2 incorporation.

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P2

Accumulator batteries and operation of electric vehicles

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Accumulator batteries present a basic operational component of electric vehicles. Their functional characteristics affect significantly the utilization of electric vehicles in the city transport system mainly from the point of view of their driving range. The experience obtained during the operation of electric vehicles produced by SKODA Elcar Ltd., Ejpvovice and ELIS Ltd., Plzen between 1992-1996 resulted in the fact that with regard to their purchase cost the lead-acid accumulator batteries and in a limited extent the nickel/cadmium batteries are most suitable for commercial application. The

experience obtained with both lead-acid and nickel/cadmium batteries used in the operation of electric vehicles will be presented.

At present there are 40 electric vehicles operating in the Czech Republic. These have been produced by SKODA Elcar Ltd., Ejpvovice and are the ELTRA 151L limousine and ELTRA 151 pick-up truck. Both types were gradually introduced into operation from 19th October 1992 until 3rd May 1994.

The users of these vehicles are energy, post, telecommunication, transport companies, ministries, police and wholesale organizations. The electric vehicles run in the capital city of Praha, in Brno, Plzeň, České Budejovice, Pardubice, Píbram, Karlovy Vary, Písecký, Kromerís, Raskovice and Karlstěj.

Four types of lead-acid accumulator batteries are used in these electric vehicles. Apart from 40 electric vehicles operating in Czech Republic, a further 110 examples of ELTRA 151L and ELTRA 151 pick-up trucks were sold abroad. The construction of PROTOEL XI and PROTOEL 2 electric vehicles correspond to that of ELTRA 151 L and ELTRA 151 pick-up. The reconstruction of PROTOEL XI electric vehicles was carried out by the Institute for Research of Motor Vehicles, Praha and by the company TESLA Vrchlabí. The reconstruction of PROTOEL 2 was carried out by the above Institute. Nickel/cadmium batteries made by the French company SAFT have been used in both these electric vehicles.

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The calculated discharge curve

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In addition to the well-known discharge curve: $U_{d,i}/V$ versus t_i/time determined by kinetics, the corresponding sequence for the open-circuit voltage, $U_{o,i}/V$ was introduced from thermodynamics. Thermodynamically, this may be experimentally observed: (1) by continuously discharging “n” cells and interrupting the discharge at i -th steps ($i = 1 \dots n$) or: (2) by periodically discharging one cell, measuring equilibrium potentials after long enough relaxation periods.