$LiFePO_4$ as a Material for the Potentiometric Sensor

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Lithium iron phosphate is a rather unique material demonstrating good reversibility in charge-discharge cycles despite the presence of several consecutive stages of the process, including a phase transition.

Such reversibility, defined by formal criteria as a quasi-reversibility, attracted the attention of researchers to lithium iron phosphate as a suitable material for a potentiometric sensor [1-3].

Tarascon [1] uses lithium iron phosphate deposited on the surface of the electronic conductor with a continuous layer, thickness up to a micrometer. This layer has a significant resistance, which makes the system very inertial.

As a sensitive element, we used a composite layer deposited on a metal substrate and containing an electrically conductive additive to facilitate electron transfer to each particle in the electrode. It would seem that thereby the competing process of lithium oxidation improves in the phase of the electrode by the oxidants present in the solution. However, high exchange currents for the lithium cation at the interface do not let the potential, in fact corrosive, to appreciably deviate from the Nernst behavior.

The obtained slope characteristics were lower than the theoretical (up to 54 mV) and depend on the method of electrode preparation.

The method of the electrode manufacturing for use as a sensor electrode was optimized, and the limit of the sensitivity to the concentration of lithium of 10^{-4} M was established.

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