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Investigation of the possibility phosphorus-containing cathode materials obtain by extraction-pyrolytic method

Tamara N Patrusheva, Lyudmila.F Drozdova, Yuliya S Rassoschenko, Vladimir A Sannikov and **Valeri Yu Kirpichnikov**
BGTU Voenmech, St. Petersburg, Russia

The development of materials for the positive electrode is an important area of research. Their main goal is to reduce the cost of production, increase environmental friendliness and increase the energy density of existing systems. The experimental work carried out to date has shown that LiFePO4 (phospho-olivine) are the promising cathode materials, since they do not contain expensive chemical elements and are safe to operate. One of the promising directions for improving the characteristics of cathode materials is associated with the use of nanotechnology in the synthesis of cathode materials. We are developing the solution extraction-pyrolytic method [1] for the synthesis of cathode materials. This merhod consists in the extraction of individual metals from inorganic salts with the help of organic extractants, which leads to the production of pure liquid-phase precursors, followed by mixing the components in the solution in the right stoichiometric ratio and heat treatment in air to form a complex oxide. The extraction carried out in separatory funnels with 2-Ethyl-hexyl phosphoric acid at a temperature of 20 °C. The ratio of the components was calculated from the extraction equation. Studies carried out to obtain Li-Fe-P-O compounds with different phosphorus content. The Li-Fe-P-O obtained on a ceramic substrates after annealing at 600-700 °C and investigated by X-ray diffraction (Fig. 1). The main phase is also lithium iron phosphate LiFeP2O7 equation.

Figure 1: X-Ray diffraction image of Li-Fe-P-O compounds by extraction-pyrolysis method.

Recent Publications:

1. T. N. Patrusheva , V. A. Fedyaev , S. D. Kirik , R. Yu. Rudenko, and A. I. Khol'kin The Application of Titanium Dioxide Coatings by the Extraction-Pyrolysis Method // Theoretical Foundations of Chemical Engineering, 2017, Vol. 51, No. 5, pp. 759–762.
2. G.N. Shelovanova, T.N. Patrusheva, N.E. Avilov Effective phototransformation in a heterostructure based on copper(I) oxide and cadmium tin oxide // Physics of the Solid State, 2017/ 59(2), 246-250.
3. Patrusheva T.N., Belousov A.L. Energy-saving and electrochromic glass obtained by extraction-pyrolysis technique // European journal of natural history. 2017. 2. P.15-17.

Biography

Patrusheva T.N. has completed his PhD at the age of 27 years from Technological University in St.Petersburg and postdoctoral studies from Mendeleev University in Moscow. She is the professor of Baltic State Technical University "Voenmeh" by Ustinov St. Petersburg. She has published more than 150 papers in reputed journals.

pat55@mail.ru