

Lithium-ion Battery Group



HEAD:

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GROUP MEMBERS:

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PhD students: Maciej Boczar, Hermes Llain Jimenez

RESEARCH PROFILE:

Principal investigations of electrochemical phenomenon in intercalated compounds. Synthesis, construction and electrochemical analysis of lithium and sodium ion battery materials. Electrochemistry of intercalation compounds in non-aqueous media.

CURRENT RESEARCH ACTIVITIES:

Synthesis and determination of physicochemical and electrochemical properties of lithium-manganese orthosilicate as a cathode material in lithium-ion battery (NCN OPUS Project). Development of new synthetic route of lithium nickel-manganese-cobalt oxide as a positive electrode material. Development of lithium titanate oxide as a negative electrode in lithium-ion battery. Construction and determination of electrochemical parameters of lithium-ion battery in Swagelok and coin-cell type cells based on developed materials. Construction and electrochemical properties of lithium-ion batteries in new electrolytes (PolStorEn Consortium). Construction of lithium-ion battery prototype in cylindrical standard 18650 (TECHMATSTRATEG Project). Determination of electrochemical parameters of commercial lithium-ion electrodes (VARTA) for electrochemical model predicting battery performance and cycle life (H2020 Project). Preparation of copper oxide electrode for primary lithium-ion cells.

SELECTED PUBLICATIONS:

1. M. Krajewski, B. Hamankiewicz, A. Czerwiński, Voltammetric and impedance characterization of $\text{Li}_4\text{Ti}_5\text{O}_{12}/\text{n-Ag}$ composite for lithium-ion batteries, *Electrochim. Acta.* 219 (2016) 277–283.
2. B. Hamankiewicz, M. Michalska, M. Krajewski, D. Ziótkowska, L. Lipińska, K. Korona, M. Kamińska, A. Czerwiński, The effect of electrode thickness on electrochemical performance of LiMn_2O_4 cathode synthesized by modified sol-gel method, *Solid State Ionics.* 262 (2014) 9-13.
3. M. Michalska, B. Hamankiewicz, D. Ziótkowska, M. Krajewski, L. Lipińska, M. Andrzejczuk, K. Korona, A. Czerwiński, Influence of LiMn_2O_4 modification with CeO_2 on electrode performance, *Electrochim. Acta.* 136 (2014) 286-291.
4. M. Krajewski, M. Michalska, B. Hamankiewicz, D. Ziótkowska, K.P. Korona, J.B. Jasiński, M. Kamińska, L. Lipińska, A. Czerwiński, $\text{Li}_4\text{Ti}_5\text{O}_{12}$ modified with Ag nanoparticles as an advanced anode material in lithium-ion batteries, *J. Power Sources.* 245 (2014) 764-771.
5. D. Ziótkowska, K.P. Korona, B. Hamankiewicz, S.-H. Wu, M.-S. Chen, J.B. Jasiński, M. Kamińska, A. Czerwiński, The Role of SnO_2 Surface Coating on the Electrochemical Performance of LiFePO_4 Cathode Materials, *Electrochim. Acta.* 108 (2013) 532-539.
6. B. Hamankiewicz, A. Czerwiński, M. Krajewski, M. Michalska, L. Lipińska, J. Kozakiewicz, J. Przybylski, K. Sylwestrzak, W. Sarna, Lithium-ion battery, Polish Patent Pending P.416704.