Sulfolane with LiPF_6 , LiNTf_2 and LiBOB - as a non-Flammable Electrolyte Working in a lithium-ion batteries with a LiNiO_2 Cathode

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LiNiO_2 was examined as cathode materials for the lithium-ion battery, working with non-flammable electrolyte, obtained by dissolution of solid lithium bis(trifluoromethanesulphonyl)imide (LiNTf_2), lithium bis(oxalato)borate (LiBOB) and lithium hexafluorophosphate (LiPF_6 , Fluka) in sulfolane (TMS) with 10% vinylene carbonate (VC). Apart from the electrochemical tests, it was important to set the flash point. The Li/LiNiO_2 cells were tested by cyclic voltammetry, galvanostatic charging/discharging. The LiNiO_2 cathode showed good cyclability and coulombic efficiency for the electrolyte, which contains 1 M LiPF_6 in TMS + 10% VC (195 and 140 mAh g^{-1} after 20 cycles – C/10). Correspondingly lower capacity was observed for system Li/LiNiO_2 in: 1 M LiNTf_2 in TMS + 10% VC and 1 M LiBOB in TMS + 10% VC. The $\text{LiNiO}_2(\text{solid}) + 1 \text{ M } \text{LiPF}_6 + \text{TMS} + 10\% \text{ VC}$ system shows a flash point of ca. 160.

Keywords: sulfolane, li-ion battery, cathodes: LiNiO_2 , impedance spectra

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