

NEW TYPE OF SEPARATOR FOR Li-ION AND Na-ION BATTERIES

Lomov S.

National technical university

«Kharkiv polytechnic institute», Kharkiv

Sodium-ion batteries (Na-ion, NIB) is one of the most promising candidates for replacing lithium-ion batteries (Li-ion, LIB).

It is suggest using separators made from plucked mica plates in LIB and NIB.

Figure 1 shows the structure of an elementary crystal packet of muscovite mica $Kal_2(OH)_2[AlSi_3O_{10}]$.

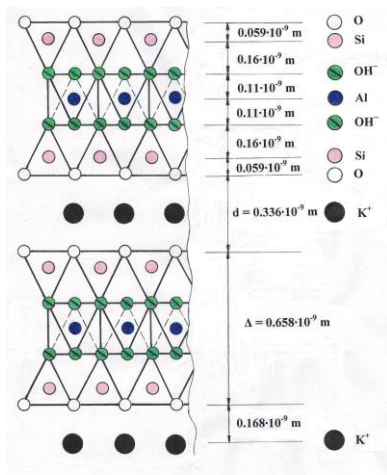


Figure 1 – The structure of the elementary packet of muscovite mica crystal

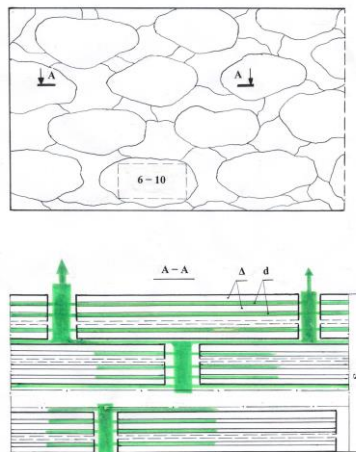


Figure 2 – Diagram of ion-exchange channels in a plucked mica separator

Figure 3 and 4 show the dependences of the stored energy in the mode of slow charge (30 minutes) and fast charge (5 minutes) at a charging voltage of 1.0 V for supercapacitor (SK) models with a plucked mica separator (curve 1) and from "Miplast" (curve 2).

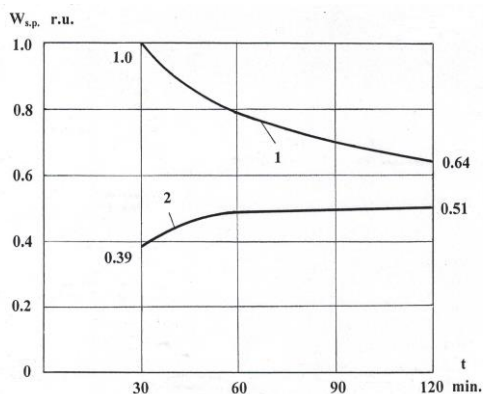


Figure 3 – Charge the model for 30 minute

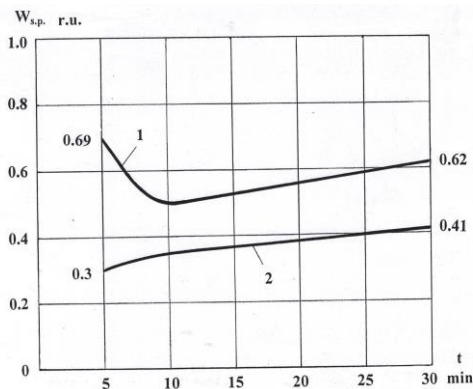


Figure 2 – Charge the model for 5 minute

There are few theoretical works, their conclusions are not very clear, but in general they boil down to an important conclusion for us - standard separators for standard batteries can be used for SC. In this case, we can count on the opposite conclusion. If the mica separator gives a positive energetic effect for SC, then the same effect should be for ionic batteries.