

Title (en)

ELECTROLYTE MATERIAL HAVING A NASICON STRUCTURE FOR SOLID-STATE SODIUM ION BATTERIES AND METHOD FOR THE PRODUCTION THEREOF

Title (de)

ELEKTROLYTMATERIAL MIT NASICON-STRUKTUR FÜR FESTSTOFF-NATRIUMIONENBATTERIEN SOWIE VERFAHREN ZU DEREN HERSTELLUNG

Title (fr)

MATÉRIAU ÉLECTROLYTIQUE AYANT UNE STRUCTURE NASICON POUR BATTERIES SOLIDES-SODIUM-ION ET SON PROCÉDÉ DE FABRICATION

Publication

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Application

EP 16784384 A 20160827

Priority

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Abstract (en)

[origin: WO2017059838A1] The invention relates to a method for producing electrolyte material having a NASICON structure based on a $\text{Na}_{2+x}\text{Sc}_x\text{Zr}_{2-x}(\text{SiO}_4)_2(\text{P}_4\text{O}_{13})$ compound where $0 \leq x < 2$, wherein initially an acidic, aqueous solution is prepared, in which sodium, scandium and zirconium are dissolved in the form of water-soluble nitrates, acetates or carbonates, as well as soluble silicates or orthosilicic acids or organic silicon compounds corresponding to the desired stoichiometry in dissolved form. Next, phosphoric acids or ammonium dihydrogen phosphate or other soluble phosphates corresponding to the desired stoichiometry are added, forming complex zirconium dioxide phosphates as colloidal precipitates. The mixture with the precipitates is then dried and calcined. The sodium ion-conducting powder, produced in this way, having a NASICON structure comprising a $\text{Na}_{2+x}\text{Sc}_x\text{Zr}_{2-x}(\text{SiO}_4)_2(\text{P}_4\text{O}_{13})$ compound, where $0 \leq x \leq 0.6$, has a particle size less than $0.1 \mu\text{m}$ and advantageously an ionic conductivity of greater than $1 \cdot 10^{-3} \text{ S/cm}$ at 25°C . For sodium ion-conducting powder where $0.3 \leq x \leq 0.6$, ionic conductivities of greater than $3 \cdot 10^{-3} \text{ S/cm}$ at 25°C can in fact be determined. The powder produced in this way can then advantageously be ground and compacted. This material is particularly advantageous as an impermeable membrane for solid-state sodium ion batteries.

IPC 8 full level

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CPC (source: EP US)

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See references of WO 2017059838A1

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