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(54) **SOLID STATE ELECTROLYTE FOR ANODE-FREE METAL BATTERY CELL**

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(57) **ABSTRACT**

A solid state electrolyte (SSE) for an anode-free metal battery cell, wherein the metal is an alkali metal, an alkaline earth metal or a metal of Group Ib, Group IIb, or Group IIIa of the periodic table, the SSE comprising a non-aqueous solvent, a metal salt of the alkali metal, the alkaline earth metal or the metal of Group Ib, Group IIb, or Group IIIa of the periodic table, an aluminium-based halogenated compound AlX_n, wherein X is a halogen atom and n is between 1 and 6, and a bis(fluorosulfonyl)imide anion. Also, a method of producing such a SSE comprising preparing a liquid precursor and exposing the liquid precursor to a temperature between 20° C. and 80° C. to solidify the liquid precursor, thereby obtaining the solid state electrolyte.