

# (19) United States

## (12) Patent Application Publication (10) Pub. No.: US 2024/0213473 A1 Kim et al.

Jun. 27, 2024 (43) **Pub. Date:** 

### (54) ANODE-SOLID ELECTROLYTE SUB-ASSEMBLY FOR ALL-SOLID SECONDARY BATTERY, ALL-SOLID SECONDARY BATTERY INCLUDING THE SAME, AND PREPARATION METHOD **THEREOF**

(71) Applicants: Samsung Electronics Co., Ltd., Suwon-si (KR); UIF (University Industry Foundation), Yonsei University, Seoul (KR)

(72) Inventors: Kyounghwan Kim, Suwon-si (KR); Jonghyeok Park, Seoul (KR); Yonggun Lee, Suwon-si (KR); Kwanghee Kim, Seoul (KR); Jusik Kim, Suwon-si (KR)

(21) Appl. No.: 18/539,499

(22) Filed: Dec. 14, 2023

#### (30)Foreign Application Priority Data

Dec. 15, 2022 (KR) ...... 10-2022-0176246 Nov. 21, 2023 (KR) ..... 10-2023-162709

### **Publication Classification**

(51) Int. Cl. H01M 4/583 (2006.01)H01M 4/04 (2006.01)H01M 4/70 (2006.01)H01M 10/0562 (2006.01)

(52) U.S. Cl. CPC ..... H01M 4/583 (2013.01); H01M 4/0407 (2013.01); H01M 4/70 (2013.01); H01M 10/0562 (2013.01); H01M 2004/021 (2013.01)

#### (57)ABSTRACT

An anode-solid electrolyte sub-assembly for an all-solid secondary battery, the anode-solid electrolyte sub-assembly including: an anode current collector; a mixed ionic-electronic conductor structure disposed on a first side of the anode current collector, the mixed ionic-electronic conductor structure containing a mixed ionic-electronic conductor, and having a plurality of openings extending along a thickness direction; wherein the plurality of openings has a structure in which at least one end is open; an interlayer disposed on the mixed ionic-electronic conductor structure and opposite the anode current collector; and a solid electrolyte disposed on the interlayer and opposite the mixed ionic-electronic conductor structure, wherein the interlayer includes an interlayer material.

