

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2024/0213444 A1 JEONG et al.

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

| (54) | ANODE FOR SECONDARY BATTERY, |
|------|--------------------------------|
| | METHOD OF FABRICATING THE SAME |
| | AND LITHIUM SECONDARY BATTERY |
| | INCLUDING THE SAME |

(71) Applicants: SK INNOVATION CO., LTD., Seoul (KR); SK ON CO., LTD., Seoul (KR)

(72) Inventors: Kwang Ho JEONG, Daejeon (KR); Seung Deok SEO, Daejeon (KR); Jae Young CHOI, Daejeon (KR); Sung Do KIM, Daejeon (KR); Jeong A KIM, Daejeon (KR); Do Ae YU, Daejeon (KR); Yong Seok LEE, Daejeon (KR)

(21) Appl. No.: 18/465,160

(22)Filed: Sep. 12, 2023

(30)Foreign Application Priority Data

Dec. 19, 2022 (KR) 10-2022-0177962

Publication Classification

| (51) | Int. Cl. | |
|------|-------------|-----------|
| | H01M 4/134 | (2006.01) |
| | H01M 4/04 | (2006.01) |
| | H01M 4/133 | (2006.01) |
| | H01M 4/1393 | (2006.01) |
| | H01M 4/1395 | (2006.01) |
| | H01M 4/36 | (2006.01) |

| H01M 4/38 | (2006.01) |
|------------|-----------|
| H01M 4/587 | (2006.01) |
| H01M 4/62 | (2006.01) |
| H01M 10/42 | (2006.01) |

(52) U.S. Cl.

CPC H01M 4/134 (2013.01); H01M 4/0404 (2013.01); H01M 4/133 (2013.01); H01M 4/1393 (2013.01); H01M 4/1395 (2013.01); H01M 4/364 (2013.01); H01M 4/366 (2013.01); H01M 4/386 (2013.01); H01M 4/587 (2013.01); H01M 4/622 (2013.01); H01M 4/625 (2013.01); H01M 10/4235 (2013.01); H01M 2004/027 (2013.01)

(57)ABSTRACT

An anode for a lithium secondary battery includes an anode current collector, and an anode active material layer formed on at least one surface of the anode current collector. The anode active material layer includes an anode active material and an anode binder. The anode active material includes a plurality of composite particles, each of the composite particles include a silicon-based active material particle, and a solid electrolyte interphase (SEI) layer formed on at least a portion of a surface of the silicon-based active material particle. A relative standard deviation of thickness values of the SEI layer of the composite particles, which are measured by an X-ray photoelectron spectroscopy (XPS) from 9 different composite particles among the plurality of composite particles after repeating 100 cycles of charging and discharging is 20% or less.

