

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2024/0213448 A1 LEE et al.

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

(54) PRE-LITHIATION METHOD OF NEGATIVE ELECTRODE FOR LITHIUM SECONDARY BATTERY, NEGATIVE ELECTRODE FOR LITHIUM SECONDARY BATTERY, AND LITHIUM SECONDARY BATTERY COMPRISING NEGATIVE ELECTRODE

(71) Applicant: LG ENERGY SOLUTION, LTD.,

Seoul (KR)

(72) Inventors: Ilha LEE, Daejeon (KR); Mun Kyu

JOO, Daejeon (KR); Sarah KIM, Daejeon (KR); Seoyoung JEON, Daejeon (KR); Yohan KWON, Daejeon (KR); Jonghyun CHAE, Daejeon (KR)

(73) Assignee: LG ENERGY SOLUTION, LTD.,

Seoul (KR)

(21) Appl. No.: 18/287,226

(22) PCT Filed: Dec. 20, 2022

(86) PCT No.: PCT/KR2022/020830

§ 371 (c)(1),

(2) Date: Oct. 17, 2023

(30)Foreign Application Priority Data

Dec. 22, 2021 (KR) 10-2021-0185204

Publication Classification

(51) **Int. Cl.**

H01M 4/1395 (2006.01)H01M 4/02 (2006.01)

H01M 4/04	(2006.01)
H01M 4/134	(2006.01)
H01M 4/36	(2006.01)
H01M 4/62	(2006.01)
H01M 10/0525	(2006.01)

(52) U.S. Cl.

CPC H01M 4/1395 (2013.01); H01M 4/0404 (2013.01); H01M 4/0423 (2013.01); H01M 4/0445 (2013.01); H01M 4/134 (2013.01); H01M 4/366 (2013.01); H01M 4/62 (2013.01); H01M 10/0525 (2013.01); H01M 2004/021 (2013.01); H01M 2004/027 (2013.01)

(57)ABSTRACT

The present application relates to a pre-lithiation method of a negative electrode for a lithium secondary battery, a negative electrode for a lithium secondary battery, and a lithium secondary battery including a negative electrode. The pre-lithiation method includes forming a negative electrode current collector layer and a negative electrode active material layer on one surface or both surfaces of the negative electrode current collector layer; forming a silver (Ag)containing metal layer on a surface of the negative electrode active material layer opposite to a surface of the negative electrode active material layer facing the negative electrode current collector layer; and transferring lithium metal to a surface of the Ag-containing metal layer opposite to a surface of the metal layer facing the negative electrode active material layer. A thickness of the Ag-containing metal layer is 10 nm or greater and 2 µm or less.

