



US 20230231119A1

(19) **United States**(12) **Patent Application Publication****Park et al.**(10) **Pub. No.: US 2023/0231119 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **PRELITHIATED AND METHODS FOR
PRELITHIATING AN ENERGY STORAGE
DEVICE***H01M 4/36* (2006.01)*H01M 10/0569* (2006.01)*H01M 4/587* (2006.01)*H01M 4/04* (2006.01)(71) Applicant: **Enevate Corporation**, Irvine, CA (US)(72) Inventors: **Benjamin Yong Park**, Mission Viejo,
CA (US); **Frederic Bonhomme**, Irvine,
CA (US); **Shiang Jen Teng**, Irvine, CA
(US); **Victor E. House**, Irvine, CA (US)(52) **U.S. Cl.**CPC *H01M 4/386* (2013.01); *H01M 10/0525*
(2013.01); *H01M 4/364* (2013.01); *H01M*
10/0569 (2013.01); *H01M 4/587* (2013.01);
H01M 4/0445 (2013.01); *H01M 2004/027*
(2013.01)(21) Appl. No.: **18/117,904**(22) Filed: **Mar. 6, 2023****Related U.S. Application Data**(63) Continuation of application No. 17/095,330, filed on
Nov. 11, 2020, now Pat. No. 11,600,818, which is a
continuation of application No. 16/213,826, filed on
Dec. 7, 2018, now Pat. No. 10,847,792.(60) Provisional application No. 62/596,053, filed on Dec.
7, 2017.**Publication Classification**(51) **Int. Cl.***H01M 4/38* (2006.01)*H01M 10/0525* (2006.01)

(57)

ABSTRACT

The present disclosure relates to prelithiated Si electrodes, methods of prelithiating Si electrodes, and use of prelithiated electrodes in electrochemical devices are described. There are several characteristics of electrode prelithiation that enable the superior battery performance. First, a prelithiated silicon anode is already in its expanded state during SEI formation, and therefore less of the SEI layer breaks down and reforms during cycling. Second, the prelithiated anode has a lower anode potential, which may also help the cycle performance of an electrochemical device. A silicon-based electrode, for use in energy storage devices, may have prelithiated silicon active material with a prelithiation level of above 0% to about 30%, with a lithium source within the energy storage devices providing excess lithium for contributing at least a portion of the prelithiation of the silicon active material.

