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(19) **United States**(12) **Patent Application Publication****Lee et al.**(10) **Pub. No.: US 2023/0231120 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **LITHIUM SECONDARY BATTERY****H01M 10/0567** (2006.01)(71) Applicant: **LG Energy Solution, Ltd.**, Seoul (KR)**H01M 10/0569** (2006.01)**H01M 4/58** (2006.01)(72) Inventors: **Dojoong Lee**, Daejeon (KR);
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Yunjung Kim, Daejeon (KR); **Kihyun Kim**, Daejeon (KR)(52) **U.S. Cl.**
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A lithium secondary battery comprising a positive electrode including sulfur, a negative electrode including a Li—Mg alloy, and an electrolyte including a furan-based solvent is provided. The lithium secondary battery has improved life-time characteristics as growth of lithium dendrites and side reaction between polysulfides leached from the positive electrode and lithium at the negative electrode are suppressed due to interaction of the Li—Mg alloy comprised in the negative electrode and the furan-based solvent comprised in the electrolyte.

