Electrochemical characteristics of carbonaceous materials originated from C60 as an anode material for lithium secondary batteries

마틴할림, 이중기[1,†]

University of Science and Technology;

[1]Korea Institute of Science and Technology

(leejk@kist.re.kr†)

Fullerenes are well-known part of carbon allotropes, which are family of caged molecules. The highly interesting physical properties of fullerene have led to possibility of using units in formation of polymerized C_{60} which can be used as an active constituent of the electrode material in lithium secondary batteries application. Fullerene used to be employed as a passivation layer when deposited on the silicon of thin oxide thin film electrode. It has been reported that fullerene stabilize the interfacial properties of silicon thin film and thus improves the cyclability. However, the use of fullerene solely as an active anode material is still remained unclear. It has been reported that lithium can be electrochemically reacted with both C_{60} and C_{70} although it was limited to only cyclic voltammetry observation. Herein, we show the study of electrochemical performance of C_{60} as a sole active anode material for lithium secondary battery application. C_{60} was deposited on Cu foil by plasma enhanced thermal evaporation deposition process. The electrochemical performance of C_{60} anode materials are affected by process parameters such as plasma power, C_{60} film thickness, and the current density.