FeS incorporated graphitic carbon for high capacity lithium-ion batteries

Rakesh Saroha[1], 허정원[1], Xueying Li[2], 안주현[1,2,†]
[1]경상대학교 화학공학과; [2]경상대학교 나노신소재융합공학과
(jhahn@gnu.ac.kr[†])

The development of lithium-ion batteries based on intercalation metal oxides has reached its limit due to the enormous research. Thus, it is foreseeable to find alternative materials with higher energy density. There has been a growing research interest in the conversion based transition metal sulfides. Iron sulfide monochalcogenide (FeS), with a high theoretical capacity of 609 mAh g−1, is attractive as a candidate for high energy density battery system. However, the FeS based electrodes possess low degree of reversibility because of limited conductivity, volume expansion (up to 200%) and associated pulverization leading to the isolation and subsequent loss of active material. The present work elucidates a simple and facile strategy to synthesize FeS/graphitic carbon (FeS/GC) composite derived from the waste of raw biomass (sawdust) in an ecofriendly and sustainable way. The FeS nanoparticles incorporated in graphitic carbon can improve the conductivity and facilitate rapid electron transport.