Synthesis and electrochemical properties of mesoporous MO_x-ZnO (M = Mn, Co, Ni, and Cu) as anode materials for LIBs

박희연, 김경호, 김지만†
성균관대학교
(jimankim@skku.edu†)

Zinc Oxide (ZnO) has been under a great deal of attention for decades in the field of solar cells, semiconductor lasers, LIBs, and other devices. As an anode material for LIBs, ZnO has various advantages such as high theoretical capacity (987mAh/g), low cost, and good physical and chemical stability. However, its large volume change (over 228%) during cycling and intrinsic poor electronic conductivity would result in drastic capacity fading and poor cyclability.

On the other hand, mixed oxides have been adopted as the anode materials to improve the electrochemical properties through the synergetic effects. Combining ZnO with other metal oxides would improve initial capacity and reduce degradation during cycling. Moreover, the electronic conductivity could increase.

In this work, mesoporous MO_x-ZnO (M = Mn, Co, Ni, and Cu) with uniform particle size were synthesized by heating under reflux. The synthesized materials were analyzed by X-ray diffraction (XRD), nitrogen adsorption-desorption isotherms, and scanning electron microscopy (SEM). It is anticipated these materials show better electrochemical performances than pure ZnO.