

In-operando X-ray Raman Scattering Study on Electronic Structure Evolution of Charged/Discharged Graphite Anode for Lithium-ion Battery

YeChih-Wei Hu (胡芝瑋)^{1*} Yen-Fa Liao (廖彥發)¹ Nozomu Hiraoka (平岡望)¹

¹National Synchrotron Radiation Research Center, Hsinchu, Taiwan

hu.cw@nsrc.org.tw

Abstract

In this study, the electronic structure evolutions in lithium-intercalated/extracted graphite anode material for lithium-ion battery during discharge and charge process were investigated by in-operando X-ray Raman Scattering (XRS). To understand the effects on graphite of lithium anion intercalation at different charge and discharge stages, the XRS experiment on carbon (C) *K*-edges at ambient conditions was used to study the bonding environment of lithium incorporated into the carbon lattice. The C *K*-edge measured via XRS showed that the C 1s to π^* absorption peak at ~284.5 eV and slightly shifted to higher energy during lithiation process and reversed during delithiation process.

Keywords -Lithium-ion Battery, X-ray Raman Scattering, In-operando