Raman Analysis to Evaluate Carbon Coating on Graphite Anodes in LIBs

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Abstract

In lithium-ion battery (LIB) anode materials, graphite is commonly coated with amorphous carbon to enhance lithium capacity. Raman spectroscopy is a powerful tool for assessing coating thickness and uniformity, as shown in Figure 1. A thicker coating corresponds to a higher I_D/I_G ratio. As particles coating are usually non-uniform, statistical analysis of hundreds of particles is required to evaluate the overall coating quality.
HORIBA provides two methods for this statistical analysis. The first approach utilizes ParticleFinder with a vacuum facility to disperse the powder into individual particles, enabling Raman measurements of each particle and determining the mean I_D/I_G value. The second approach employs Raman mapping to visualize I_D/I_G distribution. With the help of HORIBA QCarbon, the ratio distribution, its mean value, and standard deviation could be obtained by one click, streamlining the analysis process.

Figures

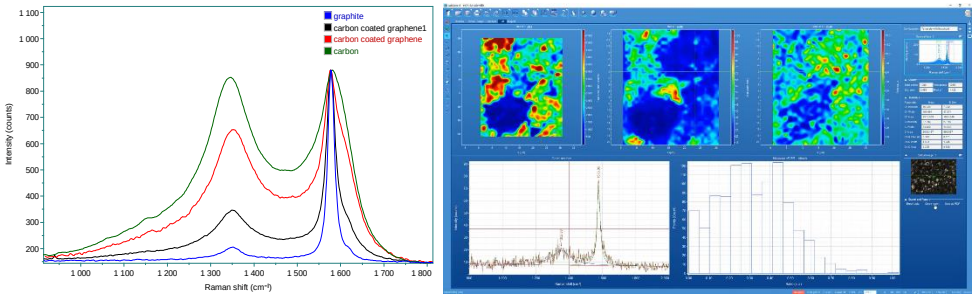

Figure 1: Left: Raman spectra of graphite, carbon and carbon coated graphite with different thickness; Right: QCarbon app to evaluate I_D/I_G by one click.

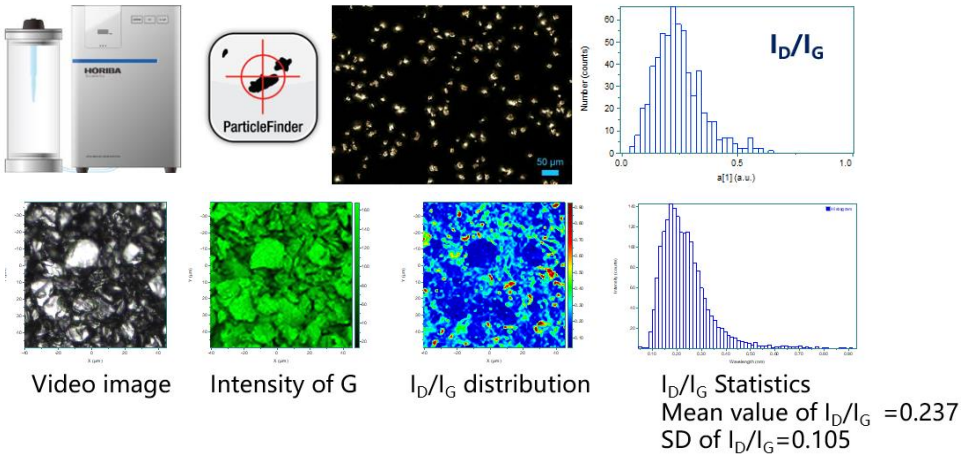

Figure 2: Two methods to evaluate the coating degree. Upper: with ParticleFinder method; lower: with mapping method.