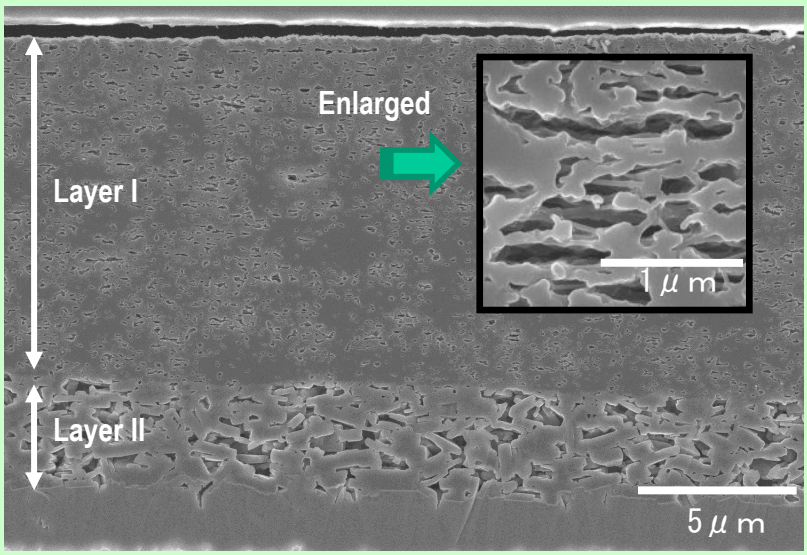
mc nac Technical Note

Lithium Ion Secondary Batteries
Analysis of the Separator

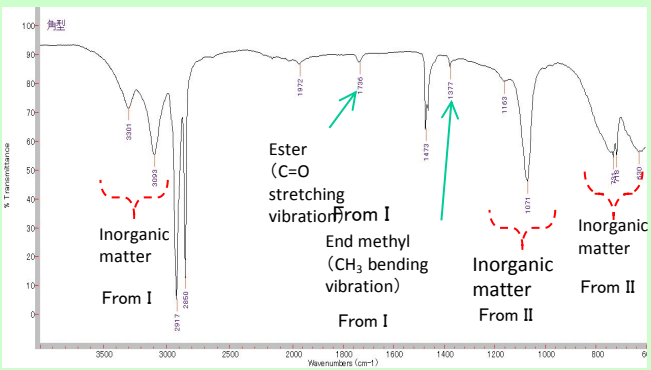
High-density PE is cited as an example of the raw material for the separator, and there are a variety of products developed, including multi-component types, heat-resistant types, and types having the function of preventing thermal runaway. We analyzed the separators used in commercially available batteries and perform a detailed analysis.

Cross-sectional SEM observation

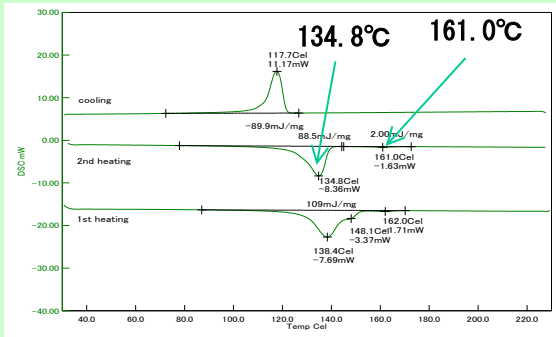


・Cryo ion milling processing makes it possible to prepare a cross section of even a separator not resistant to heat without damage while retaining the original shape.
・An enlarged view made a clear observation of the inside possible.
・It was found that the separator was of a 2-layer structure.
・As a result of element analysis (EDX), Al and O were detected from Layer III.

FT-IR



Melting point measurement by DSC



・From FT-IR and DSC measurement, it is presumed that the primary polymer component of the separator was HDPE and contained a small amount of homo PP.
・The other inorganic material detected by FT-IRで is assumed from the database and the results of the element analysis to be alumina (heat-resistant insulation layer). The ester component is presumed to be the binder resin for alumina.

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