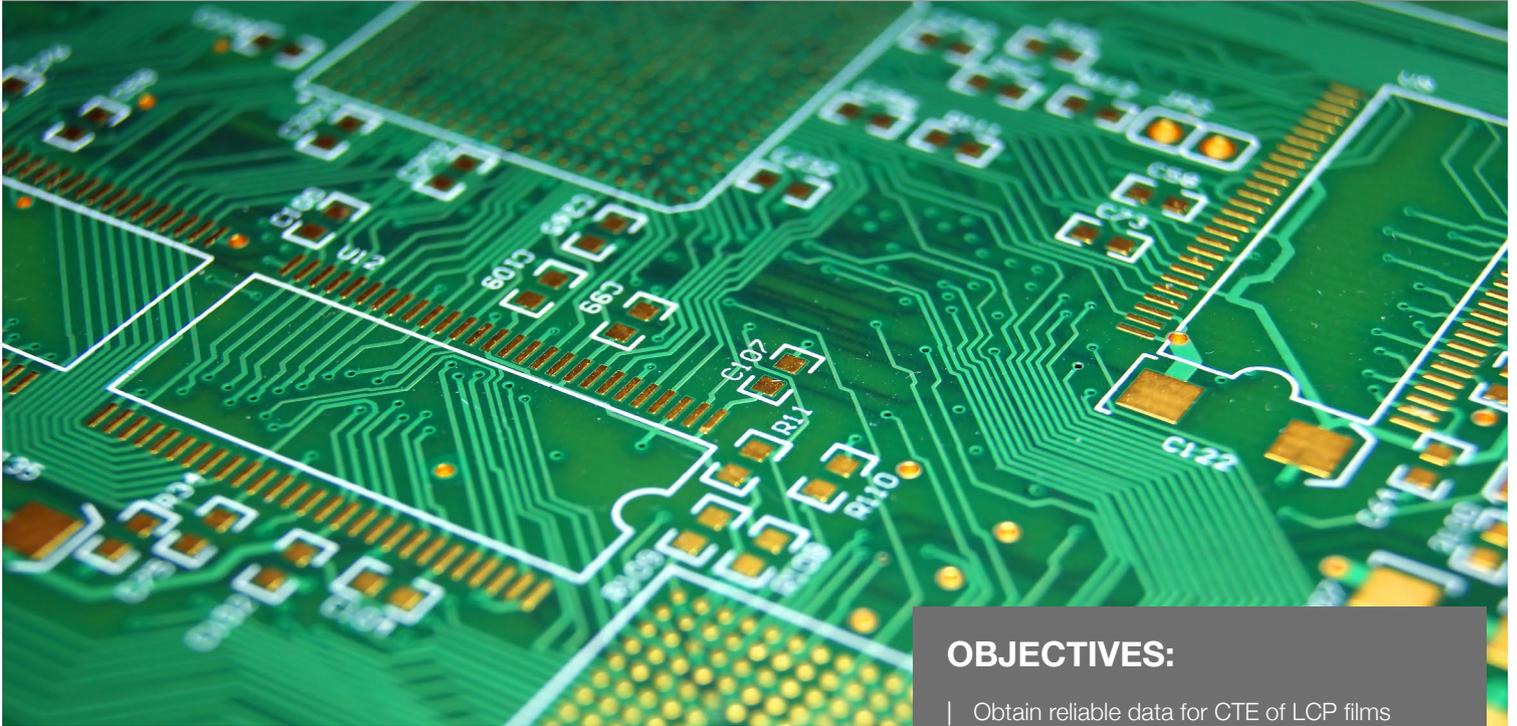


TMA7100



Award-winning company, Ningbo Jujia, uses TMA7100 to support ambitious LCP production goals

Ningbo Jujia is a technical innovation company working with liquid crystal polymer (LCP) products. With a focus on research and development, Jujia has developed an LCP film that has achieved successful batch production and, since their formation in 2017, the company has already won several awards for the first LCP film produced in China. Their goals are ambitious, and they are committed to becoming the world's top LCP supplier, which puts product quality firmly at the core of all their development and production activities.

OBJECTIVES:

- | Obtain reliable data for CTE of LCP films
- | Excellent stability and trustworthy results
- | To solve product development problems in R&D

RESULTS:

- | Assurance of mineral quality throughout
- | Shortened development cycle of new materials
- | Gained trust of more customers

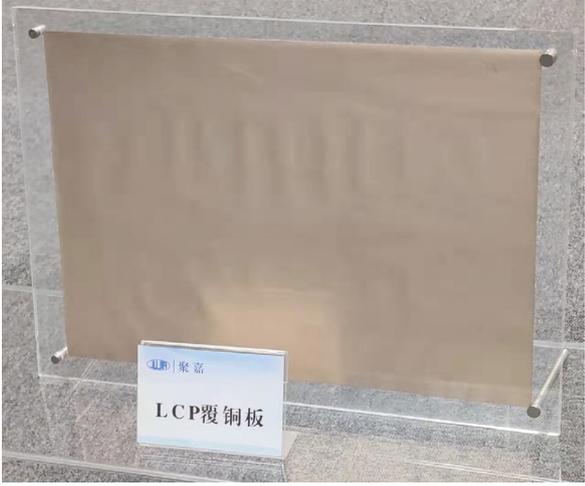
“By using the TMA7100 we have significantly shortened our development cycle and delivered qualified products to our customers ahead of schedule.”

A BREAKTHROUGH IN LCP FILM DEVELOPMENT

Ningbo Jujia's LCP film is used for many different high-tech and demanding applications, including large aircraft and 5G mobile phones. These different applications have different physical requirements for the film, including the coefficient of thermal expansion (CTE). Being able to develop film with certain CTE value was key to their development and Jujia needed a way to measure this directly at the development stage.

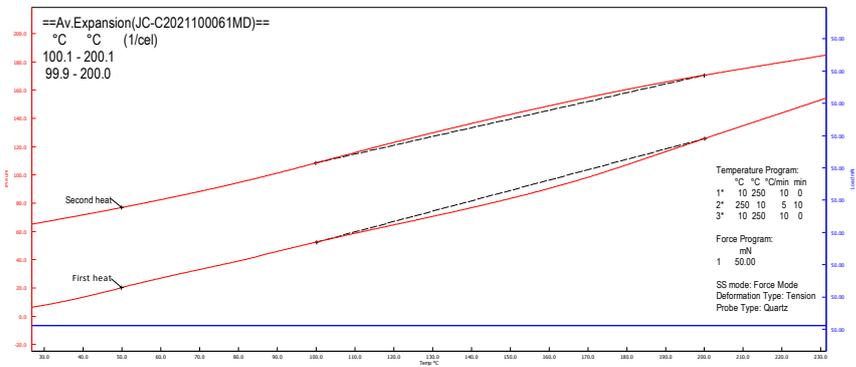
Thermomechanical analysis (TMA) is the ideal technique to measure the CTE of a plastic film. As the sample is heated, the TMA instrument measures dimensional changes when under a load from an applied force or induced by temperature change. These measuring configurations include compression, expansion, tension or flexure. For CTE analysis, the sample is taken from an initial temperature (room temperature or lower) and heated to an elevated temperature while under a minimal load. The TMA instrument measures changes in length of the sample against temperature, returning the CTE value.

It's essential that the TMA instrument is able to detect minute changes in sample size, have excellent baseline stability and deliver reliable results every time. Because the CTE value was so critical for Jujia, they researched available TMA instruments before settling on the TMA7100 from Hitachi High-Tech: "The stable performance of Hitachi's products and the professional service of the team made us choose their product. Prior to the introduction of Hitachi's TMA7100 equipment, we did not have valid data to guide the development and improvement of CTE of LCP films. By using Hitachi's equipment, we soon made a breakthrough in development and delivered qualified products to our customers."

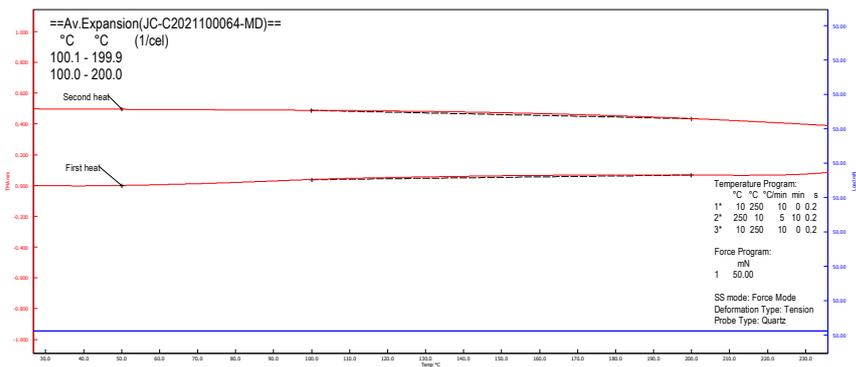


LCP Film

Graph 1



Graph 2



Sample results

The first graph shows results for a LCP film heated under constant load of 50mN from room temperature to just over 230°C. The sample is going through a heat-cool-heat cycle to investigate the effect of multiple heating cycles on CTE values. Only the heating thermograms are showed here.

The second graph shows results for a different sample. Here, you can see that the gradient during the second heating gives a negative CTE value, indicating that the sample contracts over a given temperature, rather than expands. This kind of information is essential in predicting how a material will perform when integrated within a product, such as a mobile phone.

NEW DEVELOPMENT DIRECTIONS IN THE FUTURE

Having solved a main development issue with CTE measurements with the TMA7100, Jujia intends to use more of the analyzer's functionality in the future, including penetration analysis and heat deflection temperature. The advice, training and after-sales service delivered by Hitachi and their local representatives mean that Jujia is keen to add other Hitachi thermal analysis equipment to their range of developmental equipment, further increasing their developmental capability.

Hitachi's TMA7100 thermomechanical analyzer is just one of a range of thermal analyzers that bring world class baseline stability and sensitivity to give much needed information on the smallest of material changes. Trusted by manufacturers and research labs at the forefront of materials research, Hitachi's thermal analysis range includes our unique RealView camera system that lets you see what's going on with your sample during the analysis cycle.



TMA7100 THERMOMECHANICAL ANALYZER - VISIBLY BETTER THERMAL ANALYSIS

For over 45 years, our thermal analyzers have been counted on for reliable analysis in production control and testing laboratories.

The TMA7100 thermomechanical analyzer has a wide temperature range, and the design is optimized for low noise for better accuracy and sensitivity, yet is heavy and robust enough to take on stiff samples.

If you'd like to see the TMA7100 in action visit www.hitachi-hightech.com/hha or book a demo.

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