

# The Challenge

*“Understanding interface characteristics was our biggest question. We needed to see where chemical compounds are located within the film structure.”*

— Dr. In Hwa Cho, Research Professor



PUSAN  
NATIONAL UNIVERSITY

Your Challenge, **Our Solution**  
**Park FX200 IR**



This case study is based on an interview with Dr. In Hwa Cho at Pusan National University. The research demanded nanoscale chemical identification within semiconductor thin film structures. Organic additives for film optimization are present in trace quantities —identifying their precise position within the layers was essential.

# The Solution



**Decisive Analytical Value: IR Capability**  
IR measurement enables direct observation of molecular vibrations, providing chemical identity alongside spatial information.



**Chemical Identity with Spatial Info**  
Identification of molecular vibrations in specific layers (e.g., HTL) within multilayer cross-sectional structures.



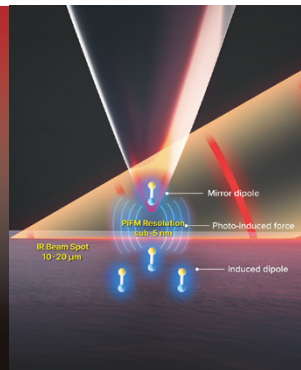
**Challenging Measurements Enabled**  
Measurements previously out of reach with conventional AFM are now achievable.



**Publication-Ready Data**  
Localized molecular vibration data is inherently difficult to obtain—when acquired, images carry high publication potential.

## Nanoscale Infrared Spectroscopy (Nano-IR)

- Resonant IR Excitation
- Non-Contact™ Force Detection
- Chemical & Spectral Mapping
- Sub-5 nm Chemical Resolution



# The Results



**Topography + Functional Group Data**  
Topographical and functional group data acquired from multiple samples, providing spatial and chemical information in a single measurement.



**Paper Published**  
Cross-sectional FX200 IR findings contributed directly to a paper now published.



**Clear Layer Distinction**  
Individual layers in multilayer cross-sectional structures clearly distinguished through molecular vibration detection, including specific layers such as the HTL.



**Improved Data Interpretation**  
The team's ability to assess and interpret chemical measurement data improved markedly following FX200 IR adoption.

*“The system differentiates layers in cross-sectional structure. Being able to distinguish molecular vibrations in specific layers—it was remarkable and the data was extremely valuable.”*

— Dr. In Hwa Cho

