

OP 059

Development of a Camera Module and Digital Image Correlation (DIC) for the Reliability Assessment of Cryogenic Welded Joints for Hydrogen Embrittlement and Liquid Hydrogen Storage Alloys

Jongwon Lee¹, Mokali Veeresham¹, **Nokeun Park**¹, Hyomin Kim², Eunjin Lee², Yoona Lee³, Namhyun Kang³, Eungryul Baek¹

¹*Yeungnam University, Gyeongsan-si, South Korea*

²*Material Solution Park, Gyeongsan-si, South Korea*

³*Pusan National University, Busan, South Korea*

Due to recent regulations on CO₂ emissions and other environmental concerns, there is a growing emphasis on the characteristics of welding materials in extreme low-temperature environments, similar to the focus on LNG, LN₂ and LH₂. New alloy developments and welding methods are being proposed to address these challenges. However, there has been a lack of observational technology to understand how welding materials degrade within these extreme low-temperature environments.

Our research institute has successfully developed a camera module system capable of observing the fracture behavior of specimens within extremely low-temperature refrigerants, such as LN₂. In this presentation, we aim to introduce our recent camera technology operating at LN₂ (-77 Kelvin) and share practical applications, such as Al alloys and dissimilar metal weld, of our observation and digital image correlation (DIC) analysis results such as PLC or DSA phenomenon etc.