

# **Recent thermoresistive material evolutions at LYNRED for improving uncooled microbolometer products thermal sensitivity**

## Abstract Authors

Historically LYNRED (created from the merger of SOFRADIR and ULIS in 2019) has used amorphous silicon materials ("a-Si") as thermistor materials for its uncooled microbolometer products. If a-Si materials present several advantages that made the success of LYNRED's products (easy to use and integrate in thermal camera), their intrinsic bolometric performances (i.e. TCR and 1/f noise) are still lower than the commonly used oxides thermistors [1] (i.e. VOx[2] and TiOx[3]). In order to stay in a leading position regarding sensor performances without any trade-off, LYNRED, with the support of its historical R&D partner the CEA-LETI, developed new materials. This strategy has led to new cutting edge products. At the end of 2020 a new 17  $\mu\text{m}$  pixel pitch product (Pico640s [4]), with one of the highest sensor performance reported on the market (typical thermal sensitivity of 25 mK (f/1, 300K, 30Hz)), has been introduced in our product portfolio. We also launched our state of the art 12  $\mu\text{m}$  product range with performances equivalent to our current 17 $\mu\text{m}$  product range. More generally, these developments open up new opportunities toward smaller pixel pitch. The symposium presentation and the associated article will present how we have increased the "Signal to Noise Ratio" (SNR) of our products while keeping all the elements that have been our hallmark. Special attention will be paid to NETD, stability of product characteristics during operation and manufacturing excellence. All these features were obtained only by hardware (at the pixel level) improvements without the need to use sophisticated algorithms or specific ROIC functions, in the spirit of LYNRED's FPA products.

## Presenter

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I obtained my doctoral degree in materials science at the Grenoble University in 2016. Currently, I am the technical expert at LYNRED in charge of developing new materials for uncooled microbolometer products.

