sInfraRed
a Xenics company

Application Note: XEVA 1.7 320 TE3 for low light level imaging

XEVA 1.7 320 TE3: Key performance indicators

- *Only 3-stage cooled InGaAs 2D camera in the world*
- *InGaAs sensor 320x256 format with 30µm pixel pitch*
- *Quantum efficiency of 80% in the 900 to 1700nm range*
- *Peltier cooler allows for 210K sensor temperature (in a 293K ambient)*
- *Integration times up to 30s in high gain mode*
- *Detectivity (D*) up to 1E15 cm.$Hz^{1/2}W^{-1}$*
- *USB 2.0 or CameraLink*
- *Also available with water cooling instead of fan*

All chip manufacturers aim for highest possible yields to meet ever tighter cost constraints. As a precondition, any imaginable source of failure must be uncovered already in the design phase, during pilot processing as well as in volume manufacturing.

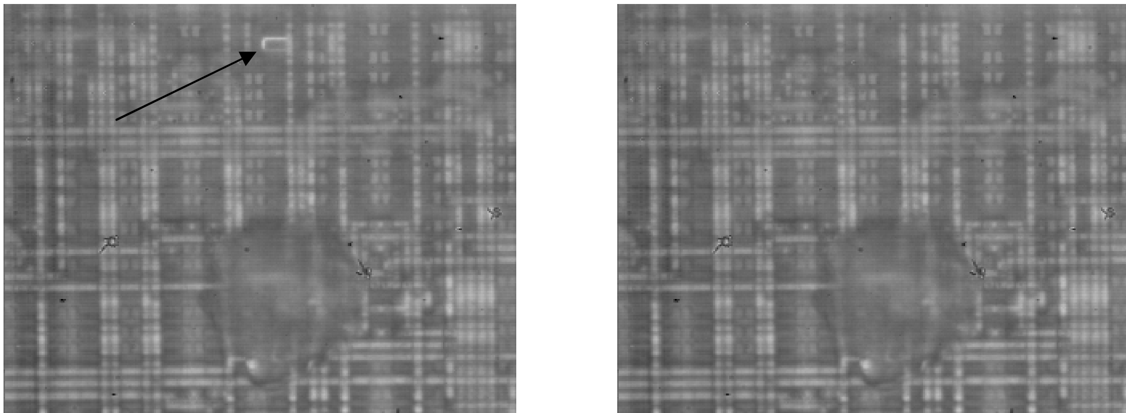
Photon emission microscopy

Photon emission microscopes detect faint emissions caused by semiconductor device anomalies (generally associated with forward or reverse biased pn junctions, transistors in saturation or dielectric breakdown) to specify the failure location. As lower device voltages lead to longer emission wavelengths, a SWIR InGaAs camera's high sensitivity in the 900 to 1600 nm range, becomes very important. It offers a high level of detection capability in low-drive IC chips and in faint emission analysis (see Fig.1).

However, the growing number of metallization layers complicates examination from the front. Fortunately, silicon at low doping levels is transparent to SWIR light, and therefore, InGaAs cameras can be used either in a back or a front examination set-up.

Nanotechnology

The successful use of highly sensitive SWIR InGaAs cameras such as the XEVA 1.7 320 TE3 for photon emission analysis of semiconductor defects has raised the interest of material scientists in other fields. They too are intensively investigating weak luminescence effects, especially photoluminescence. As an active analysis procedure, photoluminescence imaging excites the sample through laser radiation. This can be used in the identification and classification of carbon nanotubes with the aim of optimizing their manufacturing processes in terms of specifically desired properties (see Fig.2).



IC power on IC power on

Fig.1: Photon emission microscopy with XEVA 1.7 320 TE3.

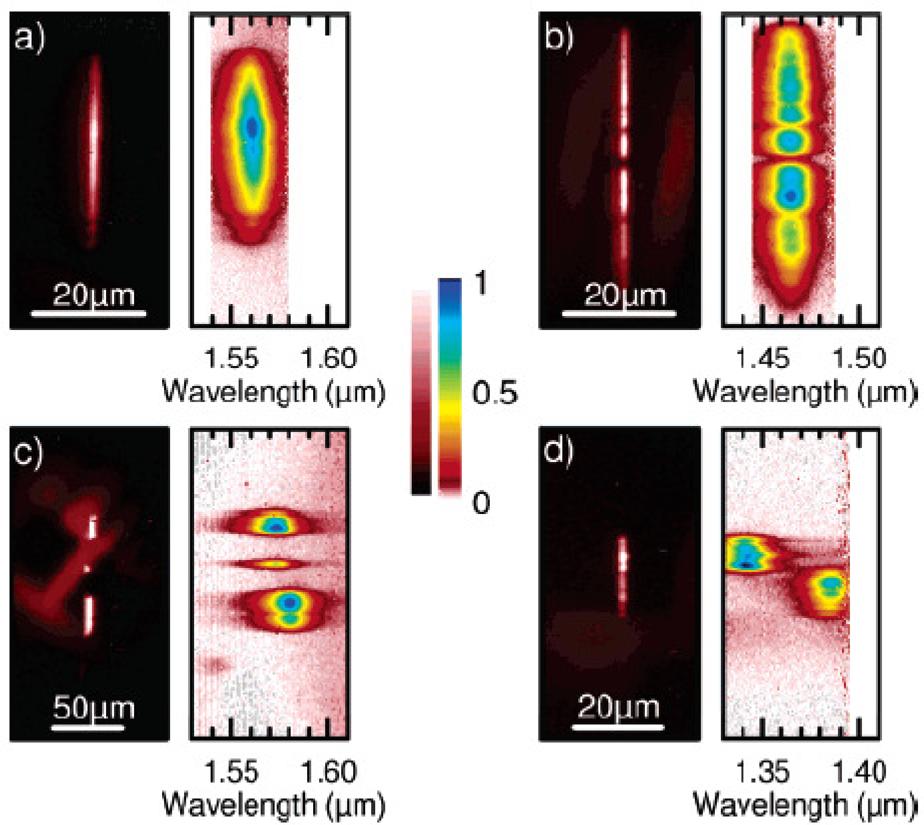


Fig.2: Carbon nanotube classification using a XEVA 1.7 320 TE3.

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