


 Inside R&D[®]
The weekly report on technical innovation

SHARPER IMAGES THANKS TO BIGGER SUBSTRATES

One of the best materials for pixels used in high-performance IR imaging applications, homoepitaxial InSb, is limited by the quality and size of the InSb substrates. A group at Northwestern University's Center for Quantum Devices has pushed the envelope by marrying higher quality, more uniform, cheaper and larger GaAs substrates with InSb films

InSb grown on GaAs works well for IR focal plane arrays (FPAs). The bigger GaAs or GaAs-coated Si substrates make for bigger arrays and consequently higher pixel counts. Additionally, the misalignment hassles that currently plague InSb-InSb arrays are minimized when InSb is bump bonded to Si circuitry.

Considering the relatively large lattice mismatch between GaAs and InSb, 14 %, it was no mean feat that the Northwestern team managed to grow high-quality InSb layers on GaAs or GaAs coated Si substrates uniformly over large areas.

The Northwestern team is further developing the technology for longer wavelength uncooled detectors using Sb-based materials such as InAsSb, InTlSb, and InBiSb. They also working on lowering the background doping level of the layers to improve device performance. It has already demonstrated infrared imaging with these layers in cooperation with Lockheed/Martin/Fairchild Systems. With improved material quality and low price, the researchers expect that these FPAs will compete in the commercial market.

They have just been awarded US Patent 5,668,395 for the processing technique. They are looking for funding, development partners and licensing opportunities.

Details: Manijeh Razeghi, Director, Center for Quantum Devices, Northwestern University, 2225 N Campus Dr, MLSB Rm 4051, Evanston IL 60208-3118. Phone: 847-491-7251. Fax: 847-467-1817. Internet: razeghi@ece.nwu.edu.

Vol. 26, No. 45 / November 12, 1997