

**NEW ALLOY  
SEMICONDUCTORS  
DETECT IR**

A group at Northwestern University has produced and tested new infrared-sensitive materials with great promise in the long wavelength (1  $\mu\text{m}$  to 12  $\mu\text{m}$ ) regions of the spectrum. The goal: high-performance, room-temperature infrared sensing. Infrared sensing, originally developed for military applications, has found surprisingly broad application to civilian markets. With growing interest in focal plane arrays, there is a great need for new materials to replace the II-VI semiconductor alloy mercury-cadmium-telluride (HgCdTe), which suffers from low yield and weak bonding.

One of the new material types uses various combinations of indium and antimony, with small amounts of alloyed thallium or arsenic. The second material is an alloy of indium phosphide and thallium phosphide. Both material types show excellent electrical characteristics, but only the indium-arsenic-antimony photodetector layers operate at 300 K as both a photoconductor and a photovoltaic detector. The thallium analog works well at 77 K, the typical temperature for cryogenic focal plane arrays, as does the indium/thallium phosphide alloys. Depending on ease of fabrication, the indium-arsenic-antimony detectors could show promise in commercial applications.

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