


Dilute nitride-based quantum well infrared photodetector (Technion)

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Optoelectronic devices operating in the near infrared (NIR) to mid infrared (MIR) spectral range offer a diversity of applications ranging from telecommunications to chemical sensors for pollution detection, chemical forensics, chemical and biological warfare, industrial process monitoring, night vision and even medical diagnostics. However, conventional material systems and IR-detectors do not effectively meet these optical range needs. This invention offers a new type of IR-device in the NIR to MIR range, based on optical transitions to foreign atoms which when inserted into standard active layers in quantum well infrared photodetector (QWIP) devices, affect electronic states. Single element devices operating at $\sim 1.5 \mu\text{m}$ at RT, that were fabricated and tested in our lab, demonstrate high responsivity of $\sim 20 \text{ A/W}$, and signal gain of ~ 1000 (which is not relevant for the dark current and dark current noise). This new type of device may potentially enable single photon detection at the NIR range.

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