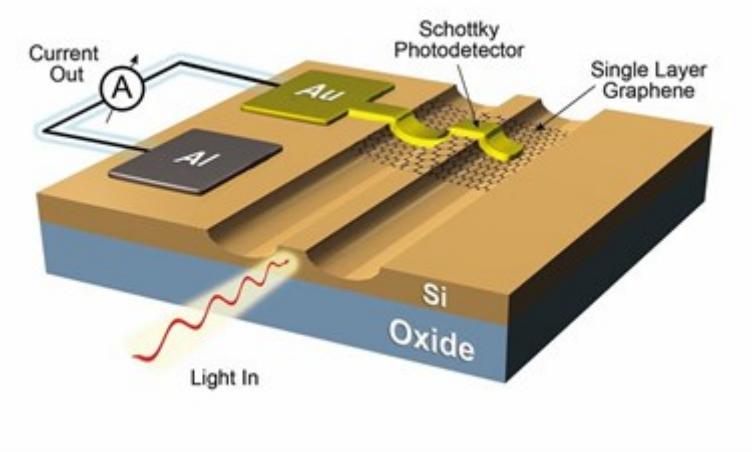
Graphene shows potential in near IR photodetection



Described as an important step towards graphene integration in silicon photonics, researchers from the Graphene Flagship have shown how graphene can enable silicon photodetection in the telecommunication wavelengths.

According to the team, silicon based photodetectors currently used in optical communications do not perform well in the near infrared range. While this has been overcome by integrating germanium absorbers with standard silicon photonic devices, this process is complex.

Addressing the issue, the team interfaced graphene with silicon on chip to create high responsivity Schottky barrier photodetectors. These devices are said to achieve a responsivity of 0.37A/W at 1550nm using avalanche multiplication. This, it adds, is comparable to the responsivity of silicon germanium detectors.

Professor Andrea Ferrari from the Cambridge Graphene Centre said: “This is a significant result which proves that graphene can compete with the current state of the art by producing devices that can be made more simply, cheaply and work at different wavelengths.” This will pave the way for graphene integrated silicon photonics, he noted.

He said that, while the potential for the detector has been demonstrated, a graphene based modulator will also be needed in order to provide a full, low energy optical telecommunication system.

“The Flagship is working hard on this problem,” he continued. “It is a great challenge and a great opportunity for Europe, as there is such high added value to the devices, it will be cost effective to manufacture them in Europe; keeping the value of the technology within the European community.”

The work was performed by the University of Cambridge, the Hebrew University and John Hopkins University.