

## DOD, UCSD, MOCVD, III-Vs, MQW and Surface Optics Corp

The US Department of Defense and the UCSD division of the California Institute for Telecommunications and Information Technology (Calit2) will jointly fund acquisition of a state-of-the-art MOCVD system for depositing thin-film layers of materials, metals and oxides on tomorrow's semiconductors.

The system will initially supply optical devices to a DoD-funded, small-business research project on 'optical tagging' - using optics to identify and track friends or enemies on the battlefield.

Under a grant from the Pentagon's Defense University Research Instrumentation Program (DURIP), the Army Research Office and Calit2 will split the \$500,000 investment in an MOCVD system.

Principal investigator, Paul Yu, is talking with several vendors before making a final selection now that the funding is approved. He is also looking into possibly purchasing a one- or two-year-old reactor to maximize on the budget.

The MOCVD system will be housed in the materials-and-devices wing of Calit2's new HQ on the UCSD campus in La Jolla, CA. Due for occupancy this summer, the new building will include 12,000sq.ft of clean rooms for micro-to-nano fabrication, surrounded by facilities for materials growth and diagnosis.

Institute division director at UCSD, Ramesh Rao, who holds the Qualcomm Endowed Chair in Telecommunications said "This investment is critical as over the next decade it will benefit many research projects

## Higher performance LEDs from Lumileds

Alan Mills

Further to our report last month about the use of Luxeon LEDs (for backlighting) in the recently, announced Sony 40 and 46" LCD television sets, Lumileds, moved the LED competition one notch higher, with the announcement of the future expansion of its Luxeon high power LEDs. It boasts of new emitters 'that set industry-wide performance standards for light output, junction temperature tolerance, moisture resistance and lumen maintenance' and white light outputs in the 65 (at 350mA) to 130 lumen range.

The company, a joint venture between Agilent Technologies and Philips Lighting, based in San Jose California, has completely redesigned the package for this improved output series, which will feature junction operating temperatures of up to 185°C. This characteristic will reduce the heat sinking need of the chips and allow the provision of more available light at any given ambient temperature. Other benefits also accrue, LED operation under higher temper-

ature conditions, the ability to use higher driver currents, a JEDEC moisture sensitivity level of 2a (4 weeks of unsealed factory floor exposure), the easier use in lighting assemblies and end-user products and presumed lower overall packaging and luminaire costs.

The new series of surface mount packages will consist of a range of LED products (seven different coloured and one white LEDs) that are scheduled for a third quarter release. They will withstand three solder reflow cycles (more rework possible) and provide new alignment features for precision assembly where critical tolerances are needed such as in automotive and other lensed applications. The new package will also comply with lead free standards (JEDEC J-STD 020c) and similar European environmental mandates (WEEE & RoHS), that will be needed starting next year.

### IP Warning

In February, Lumileds put the LED industry on notice

for a different package type, namely that it would shortly issue an advisory regarding the manufacture and assembly of mirror substrate LED packages. Lumileds holds intellectual property rights on this technology and this warning is the result of reports that some die manufacturers and LED packagers are violating the Company patents.

Lumileds warns that both LED die users and manufacturers have the responsibility to avoid infringement of these patents and that all users should investigate whether their mirror substrate LEDs use Lumiled patents and whether their sources of mirrored substrates are authorised users of the Lumiled patents. The advisory is intended to elucidate the technology covered by the Company's patents and for easier definition of compliance. No mention of license possibilities was made.

which depend on the next generation of semiconductors to enable advances in optics, displays, wireless and other fields."

The MOCVD reactor will initially be used on a collaborative program among researchers from UCSD and CA-based Surface Optics Corporation to study multiple quantum well (MQW) modulators for optical tagging, technology to be used in target tracking systems.

UCSD will become a subcontractor to Surface Optics, and will supply MQW materials to an ongoing Small Business Technology Transfer Phase II

research project led by Surface Optics chief scientist Zuhan Gu.

"The project is funded by the Army through the STTR program, which aims to increase small-business research in federal R&D and promote collaboration between small business and large research institutions," said Gu, a visiting research scientist in UCSD's Electrical and Computer Engineering department.

The MOCVD reactor will also provide materials for half a dozen ongoing research programs already supported at UCSD by DoD agencies. Those

projects range from optoelectronic ICs to nano-electronics, including advanced materials for devices such as quantum wells, dots and wires.

Yu noted that the MOCVD process offers exciting opportunities for the growth of semiconductor nanowires made of so-called III-V elements such as aluminum gallium arsenide. The MOCVD reactor will facilitate the integration of nanowires with other devices, and UCSD researchers are currently seeking DoD and NSF funding for further research in this area.