

spectrally shifted silicon devices for UV imaging & detection

Spectrally shifted silicon devices enhanced by AST's proprietary coatings utilising off-the-shelf CCDs and CMOS packages offer cost effective, high performance solutions to today's ultra violet (UV) detection and imaging problems.

Background

Conventional silicon devices are predominantly red sensitive with peak sensitivities around 800nm.

In order to be more compatible with the sensitivity range of the human eye, it is common for such devices to have this fundamental property of silicon altered by processing to make the devices more sensitive in the green and blue.

To make silicon more sensitive to ultra violet (UV) wavelengths in order to satisfy the wide ranging imaging and detection demands, usually requires extensive reprocessing and expensive electronic design.

Processes utilising lumogen type coatings have also been available for some time to enhance UV performance. This technique, involving deposition of an organic UV sensitive coating to the surface of a device has proved successful in providing a general solution for a number of UV imaging & spectroscopy applications.

Applied Scintillation Technologies also provides such coatings. However, these coatings are not optimised for individual applications and the lumogen coatings can degrade in higher intensity applications.

The AST Solution

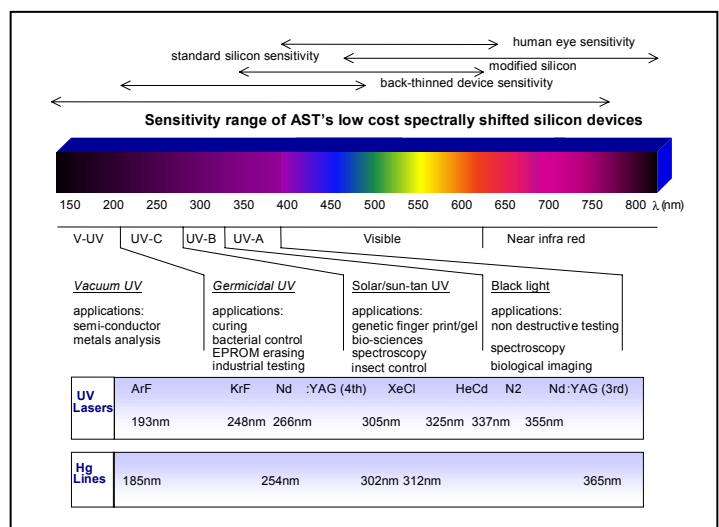
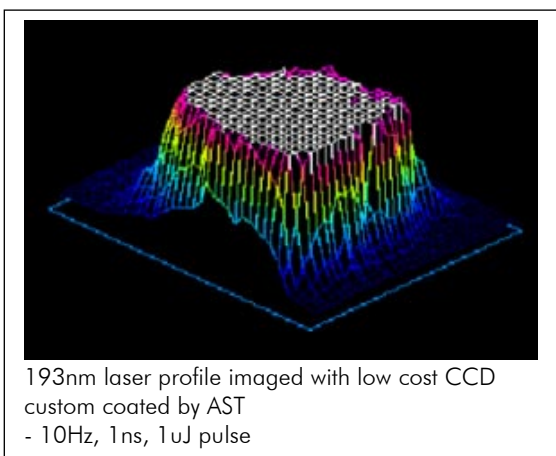
Applied Scintillation Technologies (AST) has long experience in developing and manufacturing custom coatings for a wide range of applications.

In meeting the demands of the developing market requirements, AST has developed a range of spectrally shifted silicon devices, the ExtendUV range, to provide application specific, cost effective alternatives to back-thinning and other systems.

The AST ExtendUV range is based on standard off-the-shelf silicon based devices optimally coated with custom phosphors using AST's proprietary deposition techniques.

Performance Benefits

As with many of AST's product ranges, performance enhancement is gained by ensuring that the device is designed for the task at hand at a cost-effective price. Thus while conventional back-thinned & lumogen systems offer a general solution in UV, AST ensures maximum performance with increased lifetime by utilising the wide range of materials available to them.



Materials selection parameters

AST has control over a wide variety of parameters in constructing such coatings – principally excitation spectrum, emission spectrum, resolution and noise characteristics and decay parameters.

Applications include laser profiling, UV spectroscopy (including spark analysis of metals), general UV measurement and detection. Standard materials and a summary of characteristics is provided below.

material	comment	wavelength	decay time	emission
◆ Spectralize	low noise, general UV	200 - 400nm	us	green
◆ BAMb	high sensitivity UVA & B	240 - 400nm	us	blue
◆ BAMg	high sensitivity UVA & B	240 - 400nm	us	green
◆ GORg	general to short UV	150 - 400nm	ms	green

Device platform

AST's extensive in-house analysis and materials characterisation facilities allow accurate specification of all aspects of materials behaviour. As can be seen by the graphs shown, this includes excitation, emission and efficiency data.

This allows AST to carefully select the material appropriate to the application to give optimised performance with the selected Si device. AST supplies custom coatings on a range of standard and customer specified devices, some examples of which are listed:

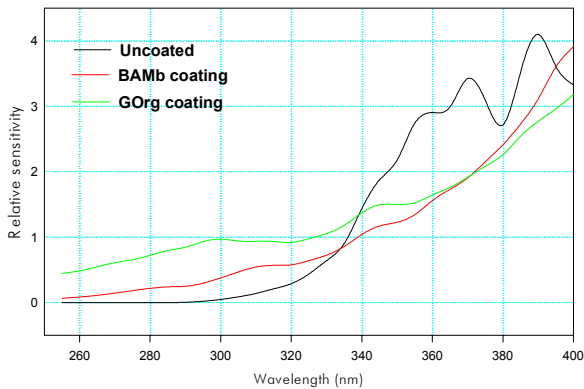
Linear CCD arrays

Sony ILX511
Sony ILX526A
Toshiba TCD1021D

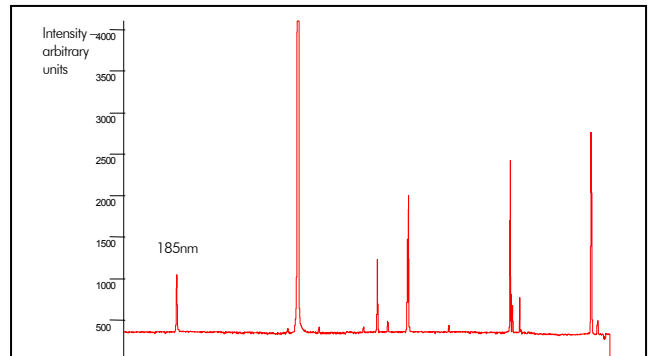
2-D CCDs & CMOS devices

Sony ICX024BL

Data showing enhancement of SONY ILX 511 performance in the UV – also demonstrates suppression of inherent devices interference fringes



As can be seen from the performance enhancement of the inexpensive SONY ILX511 (clearly showing sensitivity & resolution at 185 nm from Hg reference spectrum) AST's customising strategy, proprietary coating techniques & materials knowledge allows high performance UV imaging & detection in a highly cost effective manner.



Applied Scintillation Technologies has the knowledge and expertise based on years of experience to partner you in the development of custom products cost-effective UV imaging & detection applications using conventional silicon devices.

Resolution, sensitivity, speed & colour of response are a few of the parameters that can be influenced in the production of a customised product that more closely relates to your customer need.

- ◆ A customised product is often a more cost effective solution
- ◆ Formulations can be developed to meet your specific requirements
- ◆ Exceed your initial expectations through partnership development
- ◆ An ISO9002 company – quality assurance is guaranteed through every delivery
- ◆ Product differentiation can provide unique product positioning versus competitors
- ◆ Enjoy continued product development and technical support through partnership

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