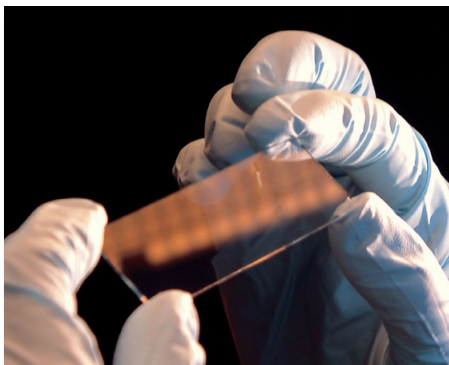


Nexterion® HiSens Slide

No protocol change – just more signal



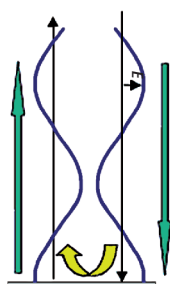
Benefits

- Significantly improved signal to background ratios for identifying low-expressor genes or low-abundant proteins
- Easy implementation with standard slide protocols
- Compatible with all common microarray equipment
- Reduced target concentrations
Reduced reagents and dye costs
- Preservation of Cy3/5™ ratios comparable to data from conventional slides
- Chemically stable reflective coating

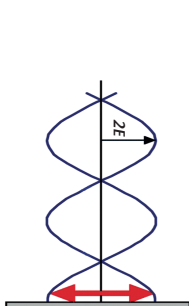
Nexterion® HiSens

Product	Item-No	Quantity
Nexterion® HiSens E (epoxy, no barcode)	1125813	25/pack
Nexterion® HiSens A (amino, no barcode)	1125814	25/pack

Reflecting wave overlaps incoming wave



standing wave pattern



Introduction

The majority of microarray users prefer to use fluorescent dyes as labels in their experiments, as their use offers high sensitivity of detection and enables detection of two or more different dyes simultaneously. Unfortunately, microarray scanners do not operate at their maximum efficiency as the detectors only acquire a small proportion of the total emitted fluorescence. There are a number of factors that contribute to the inefficient signal capture:

- Only a proportion of the total excitation light is absorbed by the microarray spots, most passes through the glass slide.
- On standard non-reflective slides there is weak, but “destructive” interference of the excitation light waves, leading to a lower fluorescent emission.
- The light emitted by the fluorescent dyes attached to the target molecule is undirected and lost through the back of the transparent glass.

To address these problems, the extensive optical glass coating expertise at SCHOTT has been employed to develop the next generation of microarray substrates: Nexterion® HiSens (**H**igh **S**ensitivity).

Short profile

The Nexterion® HiSens is an innovative microarray slide based on an ultraflat, high quality borosilicate glass slide coated with reflective dielectric layers (patent pending). The reflective layers on Nexterion® HiSens significantly enhance sensitivity and signal response. The characteristics of the reflective layers have been optimized for the fluorescent wavelengths most commonly used in microarray experiments, and will simultaneously improve the performance in both the Cy3™ and Cy5™ channels. The slide is produced with industry standard slide dimensions and high quality functional coatings for DNA and protein microarraying. This means that the Nexterion® HiSens slide is fully compatible with all microarray printing technologies and most slide processing protocols.

Coating chemistries

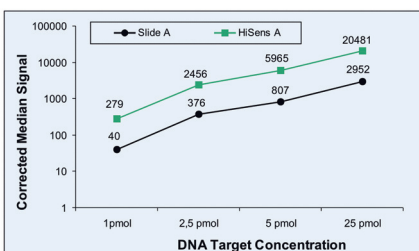
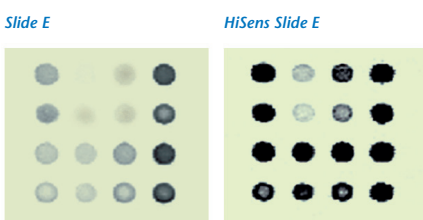
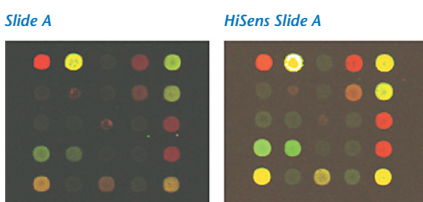
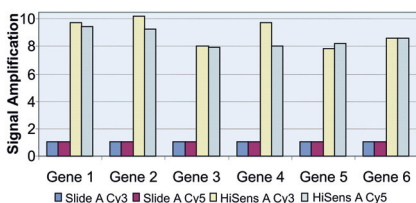
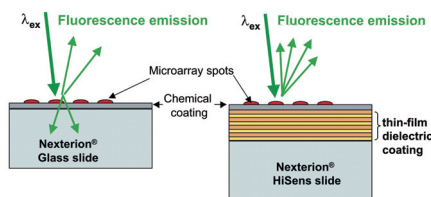
Nexterion® HiSens is initially available with either an Epoxy or Aminosilane functional coating. These two coatings represent the most commonly used microarray slide surfaces. Additional Nexterion® functional coatings will be available later.

Technology overview

The HiSens coating is able to enhance the detected fluorescent signal by exploiting several optical effects:

Fluorescence enhancement and reflection of excitation light

On a standard glass microarray slide, the fluorescently labeled spots absorb only some of the excitation light. By placing a dielectric coating beneath the spots, this “lost” light is reflected back onto the spots. In addition, the multiple layers of the HiSens coating have been specifically designed so that the incoming and reflected excitation light waves overlap and interfere with each other. The interference is constructive at the slide surface, enhancing the excitation by a theoretical factor of up to 6.3 times.



The graph shows that for a DNA microarray application, between two and ten fold less target was required to produce the same signal intensity with Nexterion® HiSens as with a conventional Aminosilane microarray slide.

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 E-Mail: coatedsubstrate@us.schott.com

Fast and easy online-ordering:
www.us.schott.com/nexterion/shop

Reflection of the emission light

The fluorescence emission in the Cy3™ and Cy5™ channels from the labeled spots are redirected towards the detector rather than being lost by passing through the glass or by scattering. This effectively doubles the detected fluorescent signal intensity.

Taken together, these effects can theoretically enhance the fluorescent signal intensity by up to 12.6 times.

Increased sensitivity

Significant increases in fluorescent signal intensities and signal-to-noise ratios have been demonstrated with the Nexterion® HiSens E and A. The functional coatings are identical to the standard Nexterion® slides. Nexterion® HiSens were processed with standard slide processing protocols and exhibit the same spot size and morphology.

Nexterion® HiSens A

Identical oligonucleotide probes were printed on Nexterion® HiSens A and standard Nexterion® Slide A, hybridized, and scanned on an Axon 4000B scanner with identical settings. Images of the Nexterion® HiSens reflective coating are compared to standard Slide A. The Nexterion® HiSens A data was normalized against the standard Nexterion® Slide A. An 8 to 10 fold increase in signal-to-background ratios was obtained with the Nexterion® HiSens reflective coating compared to the standard Nexterion® Slide A.

Nexterion® HiSens E

Identical microarray probes were printed on Nexterion® HiSens E and standard Nexterion® Slide E, hybridized and scanned using the identical settings. A large increase in signal-to-background ratios was obtained with the HiSens reflective coating compared to standard Slide E.

Improved signal response

Nexterion® HiSens is the ultimate microarray slide for microarray applications where the target material is at a low concentration or cannot be reliably amplified such as mRNAs and low abundant proteins. The Nexterion® HiSens coating may be used to produce reproducible signals at a much lower target concentration than with conventional slides.

Preservation of dye ratios

The reflective layers in the Nexterion® HiSens coating have been designed to equally enhance the performance of both the Cy3™ and Cy5™ channels. The Cy3™ to Cy5™ ratios are preserved, allowing use of standard data normalization methods and direct comparison with earlier data produced on conventional slides.

For more information please contact us or visit our homepage
www.us.schott.com/nexterion

Important information about patents

Using arrays based on SCHOTT Nexterion products for dual color analysis on a single array in which at least two different samples are labeled with at least two different labels may require a license under one of the following patents: U.S. patent nos. 5,770,358 or 5,800,992 or 6,225,625 and U.S. patent no. 5,830,645. Manufacturing and use of probe arrays may require a license under the following patents: U.S. patent no. 6,040,138 or 5,445,934 or 5,744,305 and under the following patents owned by Oxford Gene Technology Ltd. („OGT™“): European patent no. EP 0,373,203, U.S. patent nos. 5,700,637 and 6,054,270 and Japanese patent nos. 3393528 and 3386391 (“The OGT patents”). Other patents may apply. The purchase of Nexterion® products does not convey any license under any of the OGT patents or any of the other patents referred to. For all applications SCHOTT North America Inc. and SCHOTT Jenaer Glas GmbH make no representation or warranty that the practice of its technology and products or any improvement will not infringe or violate any domestic or foreign patent of any third party. Before making or using any oligonucleotide arrays you should contact OGT to discuss a licence. To inquire about licensing under the OGT patents, please contact OGT at licensing@ogt.co.uk.