

# JDS Uniphase & Color Effect Pigments

When it comes to manufacturing color effect pigments for security and decorative markets, look no further than the Flex Products Group of JDS Uniphase. The JDSU is the worldwide leading provider of broadband test and measurement solutions and is also involved in other non-color shifting security pigments for use in pharmaceuticals to prevent counterfeiting.

The group's flagship product, Optically Variable Pigment (OVP), is used in security ink for application to banknotes around the world, including the United States. It has also built devices that can photograph the color and appearance of color-shifting materials for comparison with instrumental measurements.

When the world looks to JDSU, JDSU turns to Konica Minolta.

Konica Minolta's CS-2000 Spectroradiometer was instrumental in conducting the most recent JDSU experiments.

As the international innovator of industrial color, light and shape measurement, Konica is responsible for product lines that continuously revolutionize how visual perception is measured by the world. The CS-2000, awarded the Advanced Display of the Year Grand Prize in 2008, provides highly accurate measurements of luminances as low as 0.003 cd/m<sup>2</sup> and as high as 500,000 cd/m<sup>2</sup> based on the measuring angle, with a wavelength ranging from 380-780 nm.

The objective of the latest JDSU experiment was to determine the spectral emission characteristics of three different inks and to determine which of the three pigments has the best performance in terms of strength and fluorescence.

Mike Nofi is the metrology lab manager at JDSU/Flex Products Group. During his 34 years with the group, he has been involved in quality engineering, optical fabrication and as a specialist in color science.



Konica Minolta CS-2000 Spectroradiometer

"The CS-2000 allowed us to measure the spectral emission in the visible wavelength range for each of the inks," Nofi said. "The ink with the strongest emission was selected for our project (See Figure 1)."

Each sample was mounted vertically and measured at a distance of approximately 1 m. Each sample was then illuminated at an estimated distance of 0.3 m using laser diode pen.

All three inks fluoresced with two different emissions. Nofi said these results were not possible without using the CS-2000, as no other approach was available for this type of measurement.

"The experiment allowed us to determine in a quantitative manner the best supplier of fluorescing pigments," Nofi said.

Nofi noted numerous benefits of using the CS-2000 during the experiment, including its portability, its precision, its ability to measure a very small area remotely and how easy it was to use.

The CS-2000 weighs in at 6.2 kg and does not take up much space (158 x 262 x 392 mm). The measurement time ranges from one second in manual mode to 243 seconds in normal mode. The CS-2000's wavelength precision is +/- 0.3 nm and its luminance accuracy is +/- 2 percent.

In this experiment, the CS-2000 was set to 0.1°, but it also has angular settings of 1° and 0.2°. The instrument can operate in temperatures ranging from 5 to 35°C and measurements can be started after only 30 seconds of warm-up time.

This was not the first Konica Minolta instrument Nofi has worked with, and it certainly will not be the last.

"I believe these instruments are designed to meet the needs of measurement specialists," he said. "They are easy to set up and use, and offer enough flexibility for a myriad of uses."



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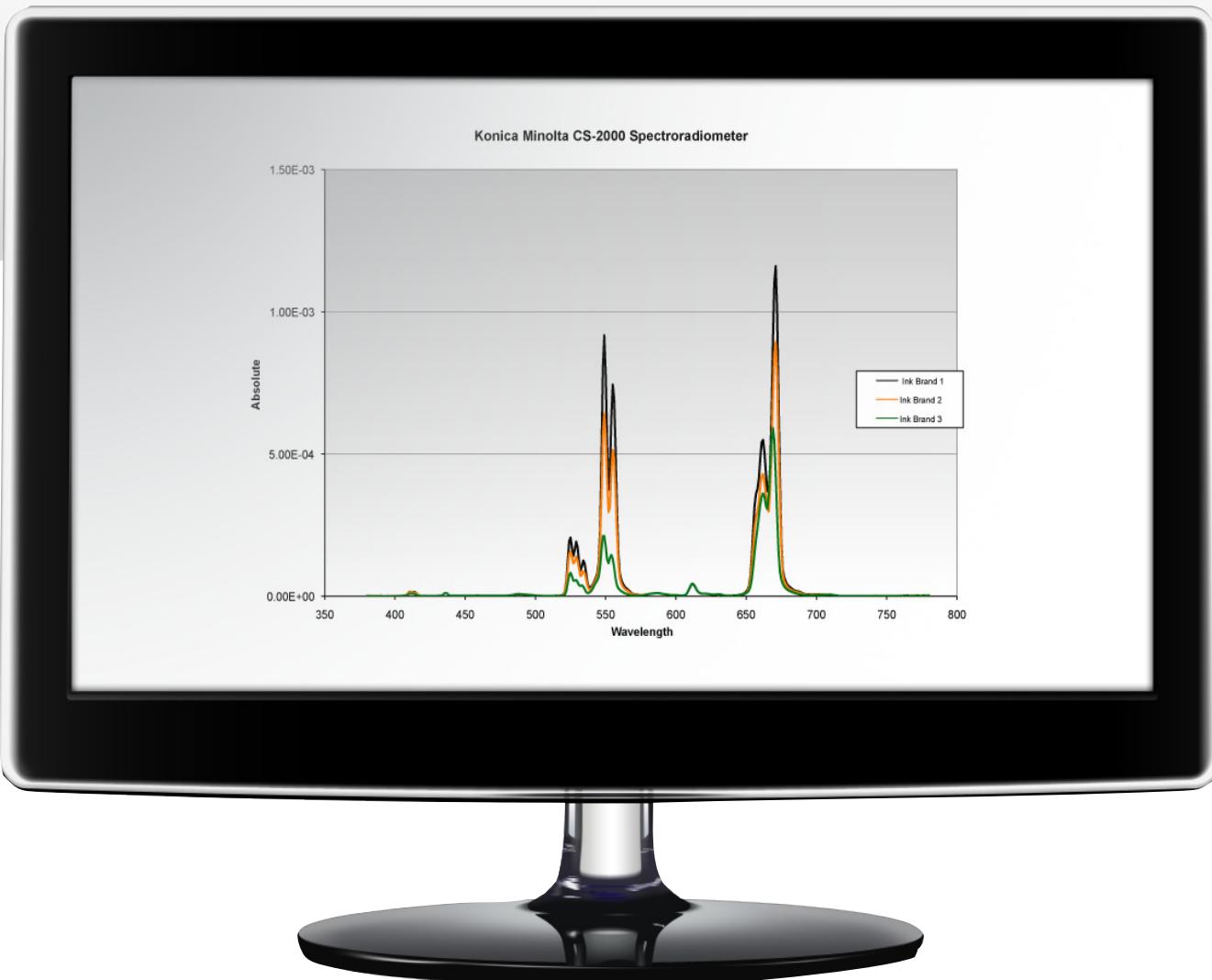


Figure 1

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Mike Nofi, Metrology Lab Manager JDSU/Flex Products Group

DISPLAY AND LIGHT MEASUREMENT