

CIGem News (December 2008)

The Bimonthly Newsletter of the Canadian Institute of Gemmology (C.I.G.)

From the Editor



I would like to wish you all a pleasant and happy Holiday Season and a prosperous New Year.

We all know that 2009 will be a challenging time for everyone. But at the same time it will give us an opportunity to reassess our priorities and explore new venues.

Gemmology has great potential for individual research at all levels. As part of our professional development we should dedicate more time to gem identification and treatments.

I have made a start in providing links to other websites with valuable gemmological information. Linking is what the web is about after all but respect the copyrights of linked web pages. Go to [The News Bulletin](#) and [Gemmology Canada](#) and find the areas of your interest. The Winter 2009 Gemology World Quiz is up too; try it [here](#).

With best wishes,

Wolf Kuehn, CIGem News Editor

The Fifth "C" by Kelly Ross, A.G. (C.I.G.)



Kelly Ross, Cpl. - now Diamond Program Coordinator, "K" Div., RCMP Customs and Excise Unit, Edmonton had his interest in diamonds "sparked" during his time as a student with the Canadian Institute of Gemmology. As a result he has written a book we highly recommend. Here is summary of The Fifth "C": The Criminal Use of Diamonds.

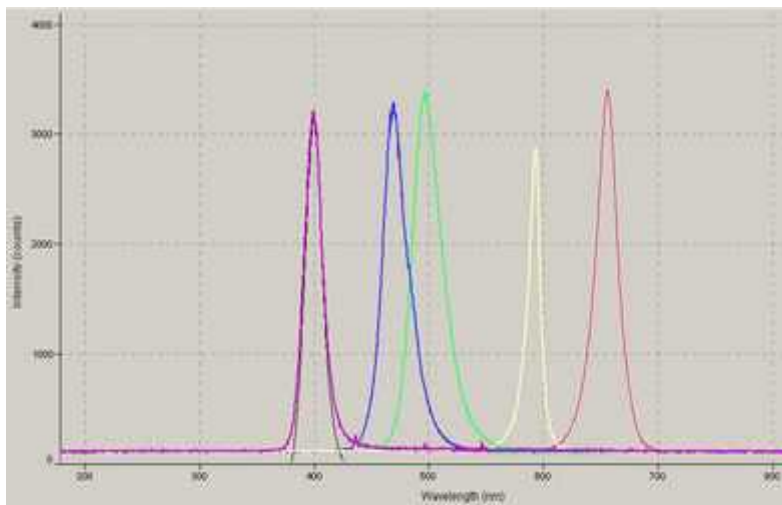
The foundation that diamond values are based on are the Carat, Colour, Clarity and Cut of a diamond. These are the Four C's of diamond grading and have been the international qualifiers used to define the value of diamonds for centuries. The contemporary diamond industry the world over has tried to introduce a fifth C in an attempt to brand diamonds as "certified" or "conflict free". The branding provides added value to the diamonds but the jury is still out on what the Fifth C really is and the court of public opinion will decide this.

The value of diamonds is also being re-defined by criminals who have sought out diamonds and like commodities in North America for decades. For criminals, diamonds are seen as instruments to facilitate criminal activity and in this age of money tracking and anti-money laundering

legislation, they are also used as a hedge against inflation and the authorities. In the world of criminals who profit from diamonds, the Fifth C is Crime.

The Fifth "C": The Criminal Use of Diamonds, exposes why criminals are so drawn to diamonds, how diamonds are used in criminal activity, and why it is difficult to stop this criminal activity.

You can order the book from [Amazon Books Canada](#) or [Amazon.com On-line](#).. Read Kelly's paper "Discussing the Identification of Rough Diamonds" [here](#)



Light Sources for Gemmology and Spectroscopy

We have experimented with inexpensive LED light sources of different colours. They provide narrow emission bands which is much better suited for testing purposes. The yellow LED can be used as a good monochromatic light source for the refractometer.

Unfortunately very little has been written about the use of coloured LEDs and references to actual

gems and their luminescence behaviour are almost non-existent.

An excellent Technology Update - Ultraviolet Light addressing this issue was published in The Guide in the Jan/Feb. 2007 edition - see links below. Perhaps it is time to compile a new set of reference data for luminescence spectroscopy.

With modern spectrophotometers we also can conduct transmission/absorption/reflectance measurements in the non-visible ranges using these new light sources.

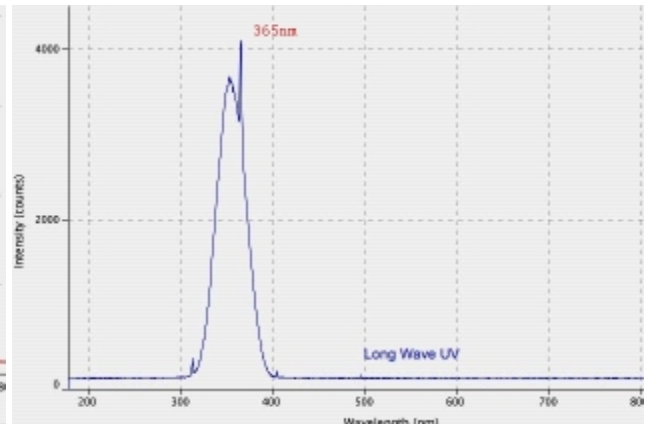
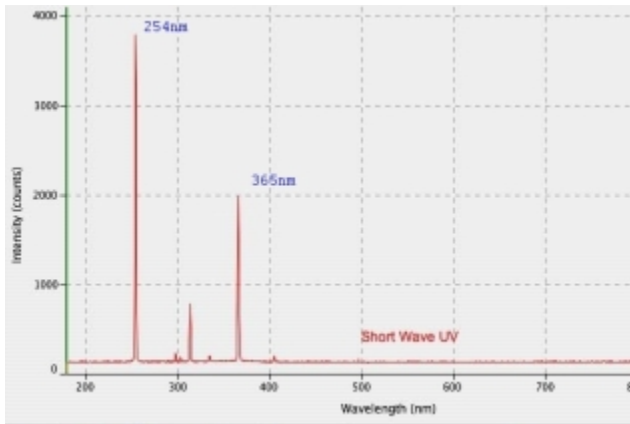
Most newer white LEDs have negligible absorption in the blue and may be used as a strong light source for hand-held spectrosopes. More recently inexpensive and very strong 1 Watt LEDs have appeared; they have a balanced spectrum and are excellent for loupe and microscope work.

Deep UV LEDs are being developed and a 270 nm UV LED is now available for under \$ 100. In combination with a UV-VIS spectroscope new exciting study fields may open up to the research gemmologist.

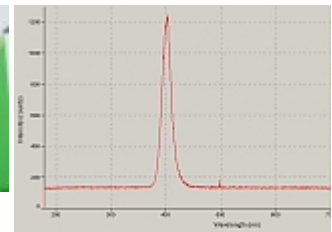
Gemmologists need to be aware of problems with commercial SW and LW ultraviolet light sources such as below.



Mineralogical Short and Long Wave UV light;
see absorption spectrum below.

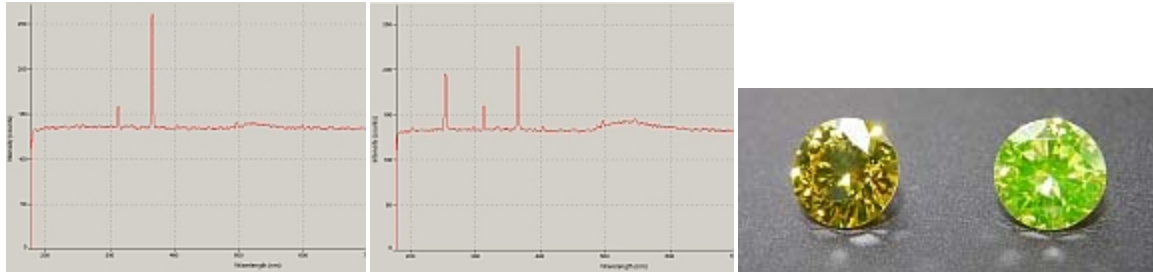


One can see that the SW light mercury spectrum (left) also shows a 365nm line which is the designated emission for the LW range when the lamp is switched to LW (right spectrum).

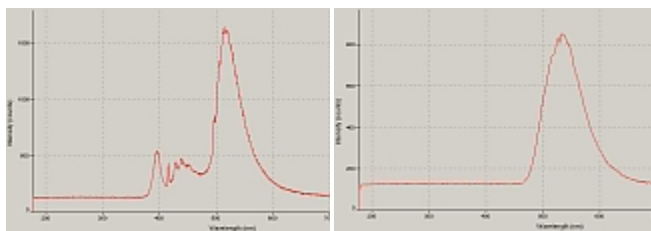


Both the inexpensive UV LED (very left) and the built-in UV light of the moissanite tester have the same narrow emission at 395 nm.

We were curious and conducted luminescence spectroscopy on two synthetic yellow diamonds first with the mineralogical SW/LW UV light source and then with the 395nm LED light source from above. The results are surprisingly different; it is quite possible that fluorescence may be activated by varying energy sources in the 395 nm bulb!



Above are 2 strongly fluorescent synthetic yellow diamonds (left deeper yellow, right synthetic of early Russian production) tested with the mineralogical SW UV light source. Despite some absorption in the SW area no information about the fluorescence of the diamonds could be obtained.



The same synthetic yellow diamonds (left deeper yellow, right synthetic of early Russian production) now tested using the 395nm LED light source: a clearly visible emission shift has occurred. This finding complies with the Stokes Law that the emission occurs at a longer wavelength (lower energy level) than the energy source used to excite the stone. As I am not a physicist I cannot provide a more detailed and scientific explanation of my observations.

All spectras were obtained with our UV/VIS/NIR Ocean Optics USB2000+ (200 - 850nm) spectroscope connected to high OH/SR fiber probes. We encourage gemmologists to conduct similar tests on other gemstones and report their findings.

For more information read the following articles: [What is the best Lamp for Gemmology?](#)  by W.B. Amos, [Technology Update-Ultraviolet Light](#)  by Bear Williams and [Gemstones and Light - The Science](#)  by Dana Schorr and Trish Odenthal, published in Gem Market News, the Guide (May/June 2008).

Coloured Diamonds



We just received a parcel of inexpensive coloured diamonds for testing. They all ranged in sizes of .20 to .25ct with a selling price of under \$ 100 each and smaller sizes from .10 - .12 ct selling for under \$ 10 each.

After initial inspection it appears that all of them were synthetic and colour enhanced - probably by HPHT/Irradiation/Annealing treatments. The

yellow diamonds showed very similar spectras as the above described synthetic diamonds of later Russian production.

With the exception of the yellow diamonds all produced a magnetic response when floating on a raft in water confirming the small metallic inclusions. The clarity grade of the stones was VS to SI. However, the stones could not be picked up with a neodymium magnet in air.

The yellow diamonds had again strong luminescence (using the 395 nm LED) but no visible spectrum with both an OPL diffraction and Beck prism spectroscope while the reddish (some more brownish than pinkish red) stones had a weak line around 640 nm. The bluish and greenish diamonds did not show any visible absorption spectrum.

We will be conducting further transmittance/absorption/reflective tests with the Ocean Optics USB2000 to see whether there is some evidence to pinpoint a particular treatment. Numerous papers have been published reporting on HPHT treated synthetic diamonds; but identifying charecteristics are often specific to the known producer.



The following class-room courses held at 555 Seymour Street, Vancouver will be available soon:

Introduction to Gemstones (Gemmology I) - Register by January 9 - [More info here](#)

- Course 110-1 Fri/Sat/Sun, Jan 16/17/18 and Jan 30/31/Feb 1, Fri, 6:15 - 9:00 p.m., Sat/Sun, 10 a.m - 4:30 p.m. (**2 weekend classes**, Vancouver) **New!**
- \$ 695 includes text-books and exam fee (no GST), study materials with binder will be shipped upon registration

Introduction to Diamonds - Register by January 30 - [More info here](#)

- Course 130-1 Fri, February 6, 6:15 - 9:00 p.m., Sat/Sun, February 7/8, 10 a.m - 4:30 p.m. (weekend class, Vancouver)
- \$495 includes text-book and exam fee (no GST), study materials with binder will be shipped upon registration

Pearls, Opal and Jade - Register by February 13 - [More info here](#)

- Course 160-1 Fri, February 20, 6:15 - 9:00 p.m., Sat/Sun, February 21/22, 10 a.m - 4:30 p.m. (weekend class, Vancouver)
- \$495 includes text-book and exam fee (no GST), study materials with binder will be shipped upon registration

For "Introduction to Gemmology" program, "Diamond Expert (C.I.G.)" and "Fine Jewellery Expert (C.I.G.)" certificate programs go to [C.I.G.'s website](#).

We have reduced the price for several books to clear our inventory. Go to [Specials](#) or visit



Past issues of C.I.Gem News: Click on the edition you want to read: [September 2008](#) - [October 2008](#) - [November 2008](#). The next newsletter will be published in February 2009.

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ISSN 0846-3611 GEMOLOGY CANADA - [Wolf Kuehn](#), Editor

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