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TO DNL Customers Anna Palka, Annie Sears, and Charles Anderson; Competitor Less Wright of BetterThanDiamond.com

FROM Charles R. Anderson, Ph.D.

SUBJ Analysis of a Diamond Nexus Labs 0.56 Carat Round Brilliant Cut Signature Series Diamond Simulant Gemstone Ordered on 27 March 2012 with Comparisons to a Diamond Nexus Labs 0.56 Carat Princess Cut Gemstone Ordered on 25 April 2007 and to a Known Signity Cubic Zirconium White Gemstone Ordered in 2007

Summary

The Diamond Nexus Labs (DNL) 0.56 carat round brilliant cut Signature Series diamond simulant gemstone, ordered by Anna Palka on 27 March 2012, was provided with Lab Report No: AIG019911422394, dated 30 March 2012. The gemstone was examined with optical microscopy after rinsing it with 70% isopropyl alcohol in water and then with 100% isopropyl alcohol. It was analyzed with x-ray photoelectron spectroscopy both at the surface and after argon ion etching 10 nm (nanometers) of material from the surface to determine the composition at the surface and immediately below the surface of the gemstone. The principal results are:

- Immediate examination of the gemstone by optical microscopy revealed that the point at the base of the gemstone had suffered shallow, but significant fracture damage prior to its final packaging for shipment.
- Other minor chips were found along some facet edges.
- Some dark inclusions were observed.
- The surface elemental composition was that of yttrium-stabilized cubic zirconia, which is often improperly called cubic zirconium. Zirconia is ZrO_2, but it does not have the cubic crystalline structure unless it is stabilized in that form with yttrium or calcium. There was also the usual super-thin layer of carbon on the surface and an unusual, though still low, concentration of fluorine in the

chemical form of fluoride. Contrary to DNL claims, there was no corundum surface coating.

- After an argon ion etch of an extremely thin layer of 10 nm of this surface material, the gemstone was found free of all surface contamination, except lower concentrations of carbon and fluorine. The composition was that of yttrium-stabilized cubic zirconia, with a low concentration of fluoride and carbide. There was further free carbon, as is usual for this material with a smaller concentration of carbide.
- The immediate and near surface concentrations of elements were similar to those found on the surface of the Diamond Nexus Labs 0.56 Carat Princess Cut Gemstone Ordered on 25 April 2007 by Charles Anderson. That gemstone was a yttrium-stabilized cubic zirconia material with no surface coating also. The diamond simulant gemstones one gets by ordering on-line from Diamond Nexus Labs do not appear to have changed significantly between 25 April 2007 and 27 March 2012.
- Both the 2012 and 2007 Diamond Nexus Labs diamond simulant gemstones are very similar to the Signity Cubic Zirconium White Gemstone.

Samples and Background

The Diamond Nexus Labs 0.56 carat round brilliant cut Signature Series gemstone, ordered by Anna Palka on 27 March 2012, was delivered by UPS on 4 April 2012. The package was in excellent condition. I opened the package and examined the contents, but did not remove the gemstone from its interior plastic container with a velvet covered foam backing until I was ready to start performing the analysis.

The gemstone was provided with an American International Gemologists Lab Report No: AIG019911422394, dated 30 March 2012, which is shown in Fig. 3 below. There are widespread reports that this laboratory has been out of business for a considerable time now, so a report issued by them on 30 March 2012 is puzzling. In the Terms, Definitions & Conditions Summary on the backside of the Lab Report, it says the following:

"Diamond Nexus Labs Created Diamond Simulants are created in a laboratory and contain the natural elements of Carbon, sulfur, iron, calcium, cobalt, nickel, yttrium, zirconium, gadolinium and hafnium, form an engineered stabilized polycrystalline. The stone is then infused and coated with corundum and other proprietary materials which are substantial and visible under microscopy. The result is a gemstone with the optical and physical properties, extraordinarily close to natural mined diamonds.

Diamond Nexus Laboratory Created Diamond Simulants are rated 9.1 on the Mohs scale of hardness, only diamond is slightly harder at 10.0. Diamond Nexus gemstones are perfect colorless and flawless gemstones with alight dispersion, brilliance, refraction

and radiance visually identical to a diamond, they are well known as an excellent substitute for diamond."

A polycrystalline material would be very unsuitable both optically and in terms of cleaving it to achieve the cuts appropriate for a cubic crystal. Diamond is a single crystal with a cubic crystal structure. Yttrium or calcium stabilized cubic zirconia is a passable diamond simulant because it is can be made in large single crystals and it has the necessary diamond-like cubic structure to be cleaved into cuts of the kind used for diamond gemstones. Our investigation will examine whether the diamond simulant supplied by Diamond Nexus Labs is a single crystal or a polycrystalline material as claimed. It will also establish the composition of the bulk material beneath the surface or any surface coating.

The corundum of the coating that Diamond Nexus Labs says is coated onto and fused with the diamond simulant gemstone is another name for alumina, aluminum oxide, or Al_2O_3. This is also called sapphire, though single crystal gemstone sapphire commonly has low concentrations of other elements to provide color centers, which give the gemstone interesting color.

The packaging and contents received from Diamond Nexus Labs are shown in the figures below:

Fig. 1. The slip box inside the shipping wrap is shown.

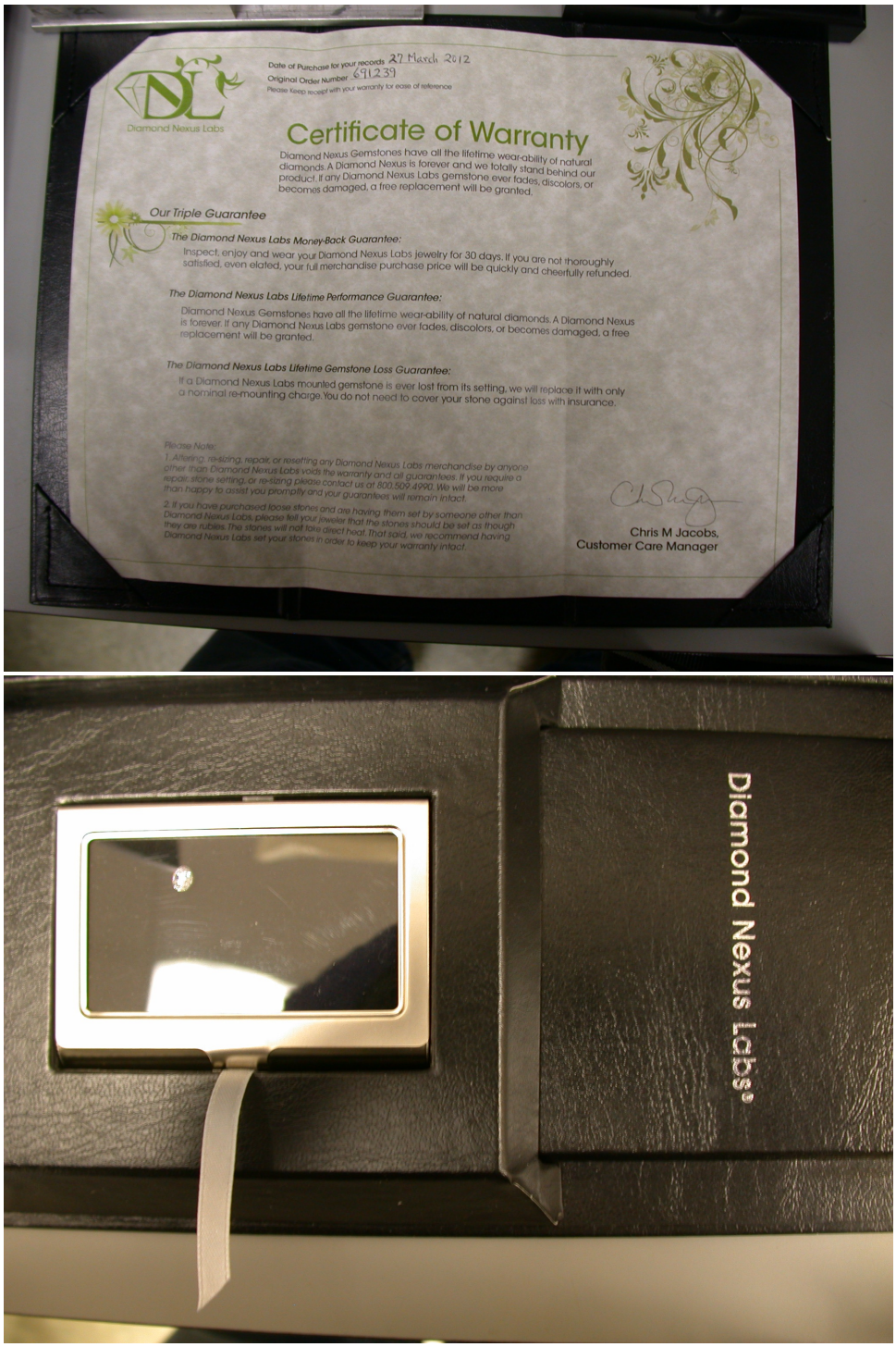
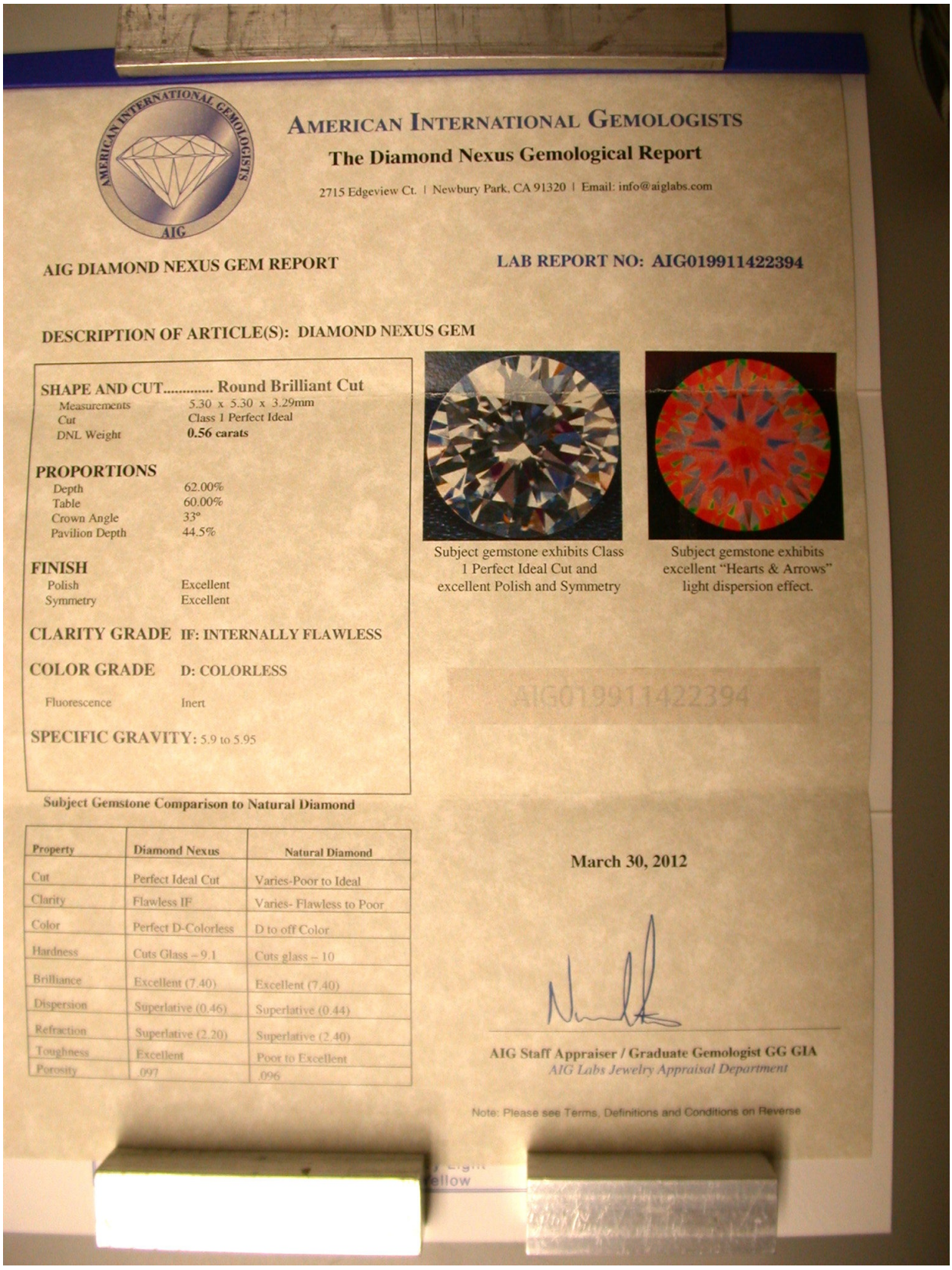


Fig. 2. The Certificate of Warranty and the gemstone in its plastic container are shown. The front facet of the round brilliant cut gemstone was pressed against the clear plastic and the bottom point was pressed into the velvet covered soft foam as-received. The gemstone is seen in the upper left quadrant of the plastic case window.



AMERICAN INTERNATIONAL GEMOLOGISTS

The Diamond Nexus Gemological Report

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AIG DIAMOND NEXUS GEM REPORT

LAB REPORT NO: AIG019911422394

DESCRIPTION OF ARTICLE(S): DIAMOND NEXUS GEM

SHAPE AND CUT..... Round Brilliant Cut

Measurements	5.30 x 5.30 x 3.29mm
Cut	Class 1 Perfect Ideal
DNL Weight	**0.56 carats**

PROPORTIONS

Depth	62.00%
Table	60.00%
Crown Angle	33°
Pavilion Depth	44.5%

FINISH

Polish	Excellent
Symmetry	Excellent

CLARITY GRADE IF: INTERNALLY FLAWLESS

COLOR GRADE D: COLORLESS

Fluorescence	Inert

SPECIFIC GRAVITY: 5.9 to 5.95

Subject gemstone exhibits Class 1 Perfect Ideal Cut and excellent Polish and Symmetry

Subject gemstone exhibits excellent "Hearts & Arrows" light dispersion effect.

AIG019911422394

Subject Gemstone Comparison to Natural Diamond

Property	Diamond Nexus	Natural Diamond
Cut	Perfect Ideal Cut	Varies-Poor to Ideal
Clarity	Flawless IF	Varies- Flawless to Poor
Color	Perfect D-Colorless	D to off Color
Hardness	Cuts Glass – 9.1	Cuts glass – 10
Brilliance	Excellent (7.40)	Excellent (7.40)
Dispersion	Superlative (0.46)	Superlative (0.44)
Refraction	Superlative (2.20)	Superlative (2.40)
Toughness	Excellent	Poor to Excellent
Porosity	.097	.096

March 30, 2012

AIG Staff Appraiser / Graduate Gemologist GG GIA

AIG Labs Jewelry Appraisal Department

Note: Please see Terms, Definitions and Conditions on Reverse

Fig. 3. The Diamond Nexus Labs Gemological Report for the examined gemstone.

The results obtained in the present analysis of the Diamond Nexus Labs diamond simulant ordered by Anna Palka on 27 March 2012 will be compared with those of the analysis of the Diamond Nexus Labs diamond simulant 0.56 carat Princess cut gemstone ordered by Charles Anderson on 25 April 2007. Comparison is also made to a Signity White Cubic Zirconia Gemstone ordered in 2007.