

Paper Number: 4286

X-ray tomography of cut and polished diamonds and gemstones

Du Plessis, A.¹, le Roux, S.G.¹, Rozendaal, A.¹ and Tolken, A.²

¹CT Facility, Private Bag X1, Stellenbosch University, South Africa (www.sun.ac.za/ctscanner)

²Gemology Department, Private Bag X1, Stellenbosch

3D X-ray micro computed tomography (μ CT) can be applied as a powerful method for the classification and unique identification of diamonds and gemstones, adding value by providing additional information as compared to traditional gemology methods. The full 3D data set can be recorded, including surface as well as internal data. This method of characterization can be used for insurance purposes and demonstrates the unique features of individual stones. The method developed and reported in [1] will be discussed in more detail.

In addition to identification, the method can also identify internal and external modifications such as laser drilled channels that have been infilled, as shown in Figure 1. Additional examples of the identification and characterization of a range of synthetic and modified gemstones will be presented.

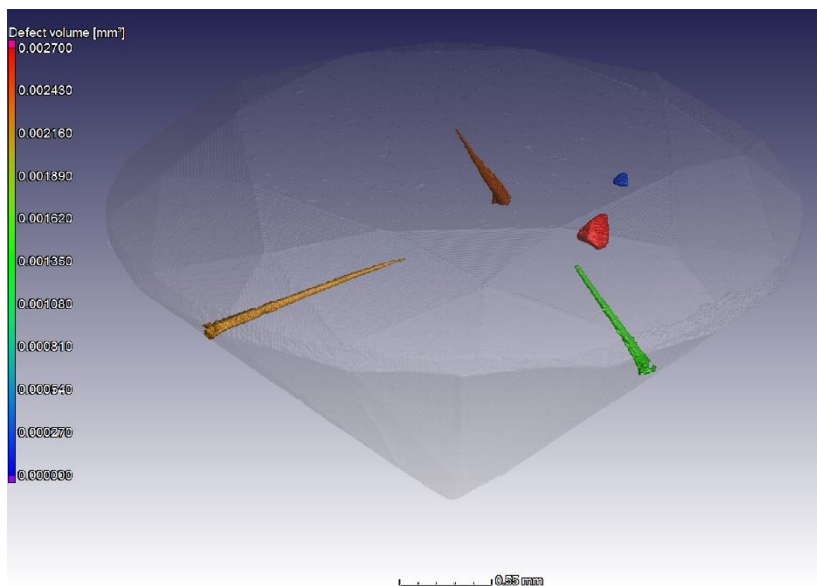


Figure 1: 3D X-ray μ CT identification of laser drilled and filled channels in a natural diamond (made transparent in this view) – three channels and 2 inclusions are false- colour coded based on volume. Figure from [1].

References:

[1] du Plessis A, le Roux SG, JGH Roux, A Rozendaal, A Tolken (2016) Gems and Gemology, Accepted.

