Method To Characterize Cut Gemstones Using Optical Coherence Tomography

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BRIEF DESCRIPTION

The invention uses optical coherence tomography to created a three-dimensional map of cut gemstones, both loose and in settings. This map will provide gemologists with information about the location and characteristics of defects, as well as providing a more accurate measure of weight for cut gemstones that are analyzed in their settings. This information can be used to accurately determine the overall quality and monetary value of cut gemstones.

FULL DESCRIPTION

Optical coherence tomography (OCT) is an optical technique used to create high-resolution, 3D images of the internal structure of objects that scatter light. The technique has established usage in the medical field for applications such as retinal imaging and more recently, imaging of vasculature through attachments to catheters. Though the primary focus of OCT has been in biomedical applications, the technique has the broader potential to image any optically scattering object.

UCI inventors have created an imaging system which uses OCT to collect high-resolution, 3D images of cut gemstones in order to precisely analyze characteristics such as overall quality, defects, and weight all of which are considerations in determining the gemstone's market value. The technique is non-damaging to the gemstones, and they may be left in their settings, decreasing the potential for damage to the settings. Additionally, the system provides an option to immerse the gemstone in a refractive index-matched nanoparticle-containing media, which uses its reflective properties to circumvent signal losses (these signal losses are due to internal reflections of the incident OCT light within the gemstones).

SUGGESTED USES

§ Three-dimensional mapping of cut gemstones for the purposes of accurate value assessment

ADVANTAGES

§ Stones can remain in setting, eliminating costly damaging to setting

§ 3-D mapping precisely locates and characterizes defects

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,458,921	10/29/2019	2016-275

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OTHER INFORMATION

CATEGORIZED AS

» **Optics and Photonics**
» All Optics and Photonics
» **Communications**
» Other
» **Imaging**
» 3D/Immersive
» **Sensors & Instrumentation**
» Other

RELATED CASES

2016-275-0

STATE OF DEVELOPMENT

Prototype of imaging system assembled and initial, high-resolution 3D maps collected on different types of cut gemstones. Additional software to calculate gemstone weight is currently under development.

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