

Title : Gemological characteristics, inclusion investigation, and chemical compositions of gemstone trade named Super Seven claimed to be from Brazil.

Author(s) : 1. Chatsuda Khamporn.

Student ID : 650510454

Major : Gemology

Advisor(s) : 1. Assistant Professor Dr. Kanyarat Kwansirikul
2. Dr. Boontarika Srithai

Type of presentation* (choose 1) : Oral Presentation (เฉพาะ ตัวแทนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
 Poster (กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
 Cooperative Education (กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

“Super Seven Quartz” is one of the trade name of the gem variety of quartz (α -SiO₂). It also contains various trace elements, including Li, Na, K, Al, Fe, Mn, and Ti. This study aimed to investigate the gemological characteristics, mineral inclusions, and chemical compositions of Super Seven Quartz, which were claimed to be from Brazil. A total of 10 Super Seven Quartz samples were examined. Based on standard gemological testing, the samples ranged from 1.170 to 2.295 carats. Their specific gravity ranged from 2.64 to 2.66. The studied samples were doubly refractive, with refractive indices ranging from 1.540 to 1.559, and birefringence values between 0.007 and 0.010. All samples were inert under ultraviolet radiation, both short-wave and long-wave UV light. Under microscopic observation, the samples exhibited red crystal inclusions, probably goethite and lepidocrocite, healed fractures and unhealed fractures. UV-VIS-NIR spectroscopy in the range of 300–900 nm. revealed absorption bands associated with charge transfer between O²⁻ and Fe³⁺ within the quartz structure. The range corresponds to the electronic transition of Fe₂O₃ in the mineral inclusions goethite and lepidocrocite. Additional absorption bands were observed in the range of 320–450 nm. A band between 500–550 nm was attributed to colour centres

*Type of presentation must be matched with an option you choosing on student upload system.

**The abstract can be more than one page and must be approved by project advisor before upload.

formed by Fe⁴⁺ activated by natural radiation, resulting in a purple to red coloration. A step-like feature was also observed, which was characteristic of iron-group mineral inclusions. Chemical compositions examined by X-ray fluorescence (XRF) point analysis of the group of inclusion areas showed the average values of silicon dioxide (SiO₂) at approximately 86.80 wt%, iron oxide (Fe₂O₃) at 8.54 wt%, aluminium oxide (Al₂O₃) 3.42 wt%, calcium oxide (CaO) 0.67 wt%, potassium oxide (K₂O) 0.28 wt%, vanadium at 0.052 wt%, sodium oxide (Na₂O) 0.038 wt%, titanium dioxide (TiO₂) 0.025 wt%, chromium oxide (Cr₂O₃) 0.11 wt%, manganese oxide (MnO) 0.042 wt%, gallium 0.006 wt%, and phosphorus pentoxide (P₂O₅) 0.001 wt%. This result of high iron content indicated that the analysed areas corresponding to the Fe-bearing inclusions. In contrast, the host quartz areas showed the average values of silicon dioxide (SiO₂) at 99.66 wt%, gallium at 0.80 wt%, aluminium oxide (Al₂O₃) at 0.24 wt%, vanadium at 0.052 wt%, manganese oxide (MnO) at approximately 0.033 wt%, titanium dioxide (TiO₂) at 0.019 wt%, calcium oxide (CaO) at 0.012 wt%, potassium oxide (K₂O) at 0.008 wt%, and low contents of chromium oxide (Cr₂O₃) and iron oxide (Fe₂O₃) at 0.001 wt%.

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

Title name guide.

ADVISOR title name / แปลไทย	
Professor Dr.	ศาสตราจารย์ ดร.
Professor	ศาสตราจารย์
Associate Professor Dr.	รองศาสตราจารย์ ดร.
Associate Professor	รองศาสตราจารย์
Assistant Professor Dr.	ผู้ช่วยศาสตราจารย์ ดร.
Assistant Professor	ผู้ช่วยศาสตราจารย์
Dr.	ดร.
Lecturer	อาจารย์
Mrs.	นาง
Ms.	นางสาว
Mr.	นาย

Major name guide.

SCIENCE MAJOR name / แปล	
Biology	ชีววิทยา
Microbiology	จุลชีววิทยา
Zoology	สัตววิทยา
Biochemistry and Biochemical Technology or Biochemistry and Biochemical Innovation	ชีวเคมีและชีวเคมีเทคโนโลยี หรือ ชีวเคมีและชีวเคมีนวัตกรรม
Chemistry	เคมี
Industrial Chemistry	เคมีอุตสาหกรรม
Materials Science	วัสดุศาสตร์
Physics	ฟิสิกส์
Computer Science	วิทยาการคอมพิวเตอร์
Data Science	วิทยาการข้อมูล
Mathematics	คณิตศาสตร์
Statistics	สถิติ

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

Gemology	อัญมณีวิทยา
Geology	ธรณีวิทยา
Environmental Science	วิทยาศาสตร์สิ่งแวดล้อม

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*