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Geological, petrographical, mineralogical, geochemical and gemological features of Malatya rubies

Introduction

Rubies are very popular gemstones first because of their aesthetic appeal. Furthermore, ruby is also a well-known multifunctional material with useful applications including as a laser material (Boulon 2012) and in high-power switches and sensors (Song et al. 2005; Sahoo et al. 2015). The use of ruby in manufacturing new materials and devices raises its technological value in addition to its gemstone characteristics (Shor and Weldon 2009). Rubies are mined from formations in Kenya (Barot and Harding 1994; Simonet et al. 2008),

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Mozambique (Chapin et al. 2015), Tanzania (Hanni and Schmetzer 1991), Madagascar (Mercier et al. 1999), Malawi (Henn et al. 1990; Rankin 2002), Afghanistan (Bowersox et al. 2000), Pakistan (Gubelin 1982), India (Schmetzer and Schupp 1994), Sri Lanka (Mahroof 1992; Carbonin et al. 1998), Myanmar (Kane and Kammerling 1992), Vietnam (Kane et al. 1991; Van Long et al. 2004; Khoi et al. 2011), Cambodia and Australia (Sutherland et al. 1998).

There are many mineralogical formation regions in Türkiye with gemological features of high quality and with precious stone features (Ethem 2007). Examples include Almus agates in Artvin (Başıbüyük et al. 2023), Ch-chalcedony in North Anatolia (Başıbüyük et al. 2020), chalcedony-amethyst formations in Yozgat (Başıbüyük, 2018; Kaydu Akbudak et al. 2018a), Opals in Kütahya (Esenli et al. 2001), in Ordu (Uz et al. 2003) and various other parts of Türkiye (Esenli et al. 2003; Esenli and Ekinci-Şans, 2013). In these studies, the physical qualities of the gemstones in question were also determined. Özdamar et al. (Özdamar et al. 2016) conducted a study on ruby mineralization, formation and properties in Türkiye. However, there is not enough information in the literature about the formation of ruby in Türkiye and its usability as a precious stone. A ruby formation was recently discovered in the Doğanşehir region of Malatya province in Türkiye by Prof. Dr. Bektaş Uz and his team. Investigations of this ruby formation are ongoing. The current initial research reported here represents an effort to understand the geology involved in its formation.

Siliceous gemstone formations in Malatya-Arguvan were investigated in terms of mineralogical, geochemical and gemological features and in the context of the economy (Kaydu Akbudak et al. 2018b). There were then attempts to determine the mineralogical and gemological characteristics of rubies in Malatya-Doğanşehir (Kaydu Akbudak et al. 2021). In contrast to these studies, this paper was conducted to reveal the gemological properties of Doğanşehir rubies and to investigate the usability of polished and cut ruby samples as gemstones.

1. Experimental methodology

The chemical, mineralogical and gemological characteristics of the samples collected from the ruby minefield under study were examined. Geochemical analyses of ruby and host rocks containing ruby were conducted by using inductively coupled plasma mass spectrometry (ICP-MS), inductively coupled plasma optical emission spectroscopy (ICP-OES), and X-ray fluorescence (XRF) (ALS, Canada). Trace element analyses were conducted using a Perkin Elmer Elan 6100 ICP-MS (ALS Lab.) instrument. Brilliant, thin sections were prepared from ruby crystals and amphibolites containing ruby to undertake petrographic examination on a Leica pole microscope (Model: DM 4500). X-Ray diffraction analyses (XRD) were conducted by using powder samples with Bruker D8 XRD instruments, for $2\theta = 2–70°$, Cu Kα radiation at a rate of 0.006°/16 s, and the results were assessed through the MDI Jade 5.0 data process program.

A Mettler Sensible Balance device was used to determine densities. Refractive indices were calculated using a Gemologische Gerede mit Zeiss optical device (determination level n:1.30-1.81). A Rubin & Son hardness pen set was used to determine hardness.

2. Geology

In recent years, multiple studies have been run detailing the properties of various ruby deposits around the world. Simonet et. al. found that ruby formation in Kenya proceeds via both primary and secondary mineralization mechanisms (Simonet et al. 2008). The primary deposition was magmatic and metamorphic. Magmatic classification is seen in syenite and monzonite. Syenites in Kenya are shown as an example. Metamorphic deposition occurs in meta-limestones, mafic granulites and aluminum gneisses. Secondary deposition can be both magmatic and sedimentary. Deposition in alkali basalts and lamprophyres is magmatic while deposition in alluvial and placers is via sedimentary corundum formation. Corundum crystallization during metamorphic deposition arises as a result of isochemical metamorphoses in silica-poor or aluminum-rich rocks. Such deposition processes develop in aluminum-rich gneisses and granulites, meta-limestones and mafic granulites. The best example of ruby mineralization in aluminum-rich gneiss and granulites is in Sri Lanka. Rubies formed in meta-limestones have a blood red color. These are of high quality and high in chromium. The presence of sapphire has also been determined in such depositions resulting from the inclusion of lamprophyres into limestone. Sapphire shows violet color formations with low iron content together with a low ratio of chromium.

The field under study for ruby formation is in the south of Doğanşehir (Malatya province). The field is accepted as a part of the eastern thorite ophiolite zone (Yılmaz 1999). Very well-studied thorite ophiolites are found mostly in a supra-subduction zone (Parlak et al. 2004). The evolution of the southeastern Anatolian mountain zone caused nappes to move toward the Arabian plate during the late Cretaceous-Miocene (Yılmaz 1993). Late Cretaceous aged Göksun ophiolite is one of the best patterns of oceanic lithosphere remains in southeastern orogeny (Parlak et al. 2009). This ophiolite contains the precious ruby formation in the vicinity of Doğanşehir, which is the subject of this study.

The field under study is made up of metamorphic and non-metamorphic peridotites, marbles and cover units. Peridotite unit rocks in the base are comprised of metamorphosed schist under high metamorphic conditions at amphibolite facies and non-metamorphic harzburgite lithologies. Marbles occur on these. All of these units are discordantly covered by young sediments. Because the main objective of the study is ruby formation, hornblendites and schist are emphasized. Precambrian-lower Paleozoic aged metamorphites represent base rock in this region and are made up of granitic gneiss, augen-gneiss-micaschist, meta-tuff and schist (Yılmaz 1999).

The area surrounding Doğanşehir is comprised of upper Paleozoic aged schist, Paleozoic-Mesozoic aged marble, Mesozoic aged ophiolite, Eocene aged volcanic, Pliocene aged terrestrial clasts and alluvium lithologies. Inside this general stratigraphy, the field under study is made up of garnet amphibolite, garnet mica schist, marble, amphibolite, meta serpentinite, talus and alluvium lithologies. Amphibolite lithologies contain zones including ruby in colors ranging between light pink and dark red with northwest-southeast extension (Figure 2). These zones are mostly massive. It is foliated where it transitions to schists. Its primary magmatic textures can be defined. Amphibolites have colors in the open field from light green to dark green. Hornblend and plagioclases are the main compositions, which allow macroscopic recognition. Neogene-aged cover sediments contain red conglomerate, sandstone and mudstone. These account for Plio-Quaternary-aged Beylerbeyi Formation and are covered by alluvium (Genç et al. 1993). The geological map of the study field in the Doğanşehir region area is presented in Figure 1.

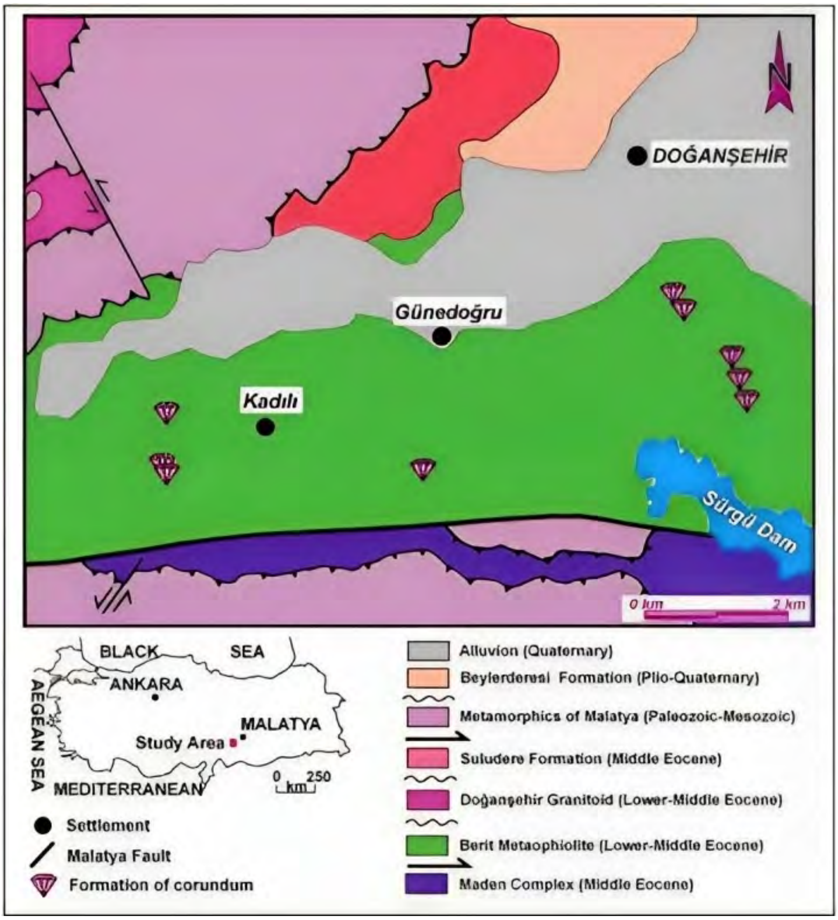

Fig. 1. Geological map of the study field (Önal 1995; Karaoğlan et al. 2013; Kaydu Akbudak et al. 2021)

Rys. 1. Mapa geologiczna obszaru badań

Fig. 2. Close-up view of a formation containing ruby

Rys. 2. Widok z bliska formacji zawierającej rubin

3. Mineralogy and petrography

According to a petrographic examination, rocks seen on the surface of the ruby minefield under study are generally high and garnet amphibolites. Rock textures are generally proto-granular. They frequently show proto-granular-porphiroclastic texture transitions. Hornblend is the essential mineral in the rocks under study. Some hornblende is coarse-grained while others are micro grained appearing in epidote/chlorites. Plagioclase, grona, feldspar, epidote/chlorite, cordierite, Cr-spinel and corundum are other minerals found in the composition. Corundum is a valuable mineral, which may exist in both high amphibolites and grona amphibolites at ratios of up to 20%. Figure 3 shows an X-ray diffractogram of the ruby crystal collected from the zone.

Results obtained from the examination of samples systematically collected from the zone under a polarizing petrography microscope are summarized. Figure 4 shows single nicol (right) and double nicol (left) images of the thin section samples. In the examination of the samples containing ruby under the polarizing microscope, there are minerals with crack-fracture in the grained crystalline texture with different grain sizes. Minerals are tightly interlocked and locally cataclastic. Secondary mineral formations are observed. These minerals are in the form of enclaves one into another. Corundum (ruby) has grain sizes in the range of 1.2–6 mm. Its edges are indented and barred. The angle of extinction was

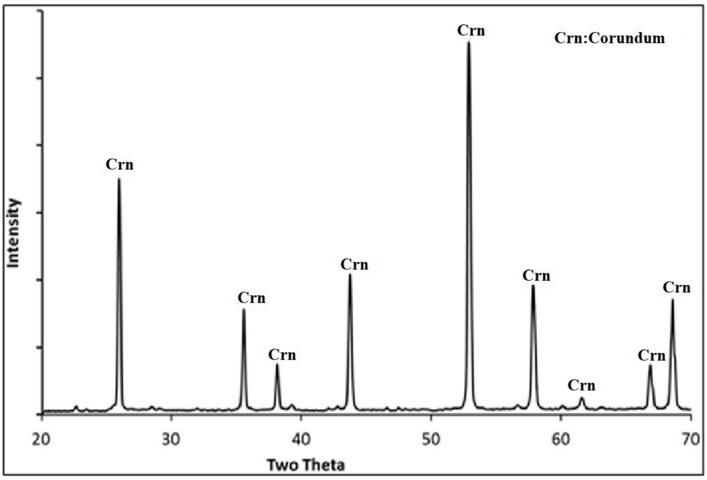

Fig. 3. Corundum in the XRD diffractograms of the ruby sample taken from the study area

Rys. 3. Korund na dyfraktogramach XRD próbki rubinu pobranej z badanego obszaru

determined as zero. It includes amphibole enclaves with high relief. Amphiboles are found together with feldspar minerals at a rate of 13–15%. Amphibole and feldspar inclusions with 6–7 mm, 2–3 mm, and 0.3 mm grain sizes are observed and these are intertwined with other minerals with different grain sizes. Amphibole-accompanied corundum (grona), shows semi-euhedral faulted crack cleavage. In cataclastic zones, thin secondary actinolite minerals are observed. Coarse-medium layered amphibole, grona and accompanied feldspars have a grain size of 0.3–0.1 mm at a ratio of 10–11%. Opaque mineral decomposition products are found in fracture-faulted zones. Ruby and garnet rock is meta amphibolite (meta gabbro, Figure 4(a) and (b)). In Figure 4(c) and (d), there are cataclastic and cracked fragments between crystalline grains. Thin lenticular minerals, which were formed secondarily, are observed between these grains. Tectonized, grained, mortier dead structure dominates the rock. The rock is multi-crack and secondary opaque formations were determined.

Plagioclases show waved side-by-side extinctions affected by pressure in the form of coarse-medium grained, twined clustered (2–3 mm). Feldspars have a high opaque content and are accompanied by mica grains. In cataclastic zones between grains, all grains making the rock up are interlaced with mortier texture in pressure-dominated places, fine-grained crumbled thin needle-shape muscovites and plagioclase (albite crystal) opaque minerals. Fine-grained plagioclases are twining (plagioclase) albite compounds. Amphiboles are crumbled along with medium-fine-grained plagioclase and corundum minerals. In cataclastic zones, plagioclase is fine-grained, semi-euhedral crumbled and grains and exhibits diamond cleavage. Corundum (ruby) is thin with a length of 2–5 mm tabular crystals, with worn edges and opaque. It shows extinction in the axial direction with high relief. Mineral grains' edges are notched and cataclastic. Plagioclase (albite) and muscovite are in the form of thin secondary vein packs shearing disjunctive rock in secondary (5–6%) opaque-cataclastic zones. By contrast, ruby-corundum contained rock, which had cataclastic deformation, is gabbroic altered rock (Figure 4(c) and 4(d)). Figure 4(e) and Figure 4(f)) show, as textural, grained crystalline and grained fractured-cracked minerals of different sizes. Due to the deformation effect, parted, cataclastic minerals with different features created recessed interlocks with each other. Thus, cataclasis, fracture and inclusion enclave one in other and secondary mineral formations developed. Corundum-ruby, with a grain size of 0.9–3.5 mm,

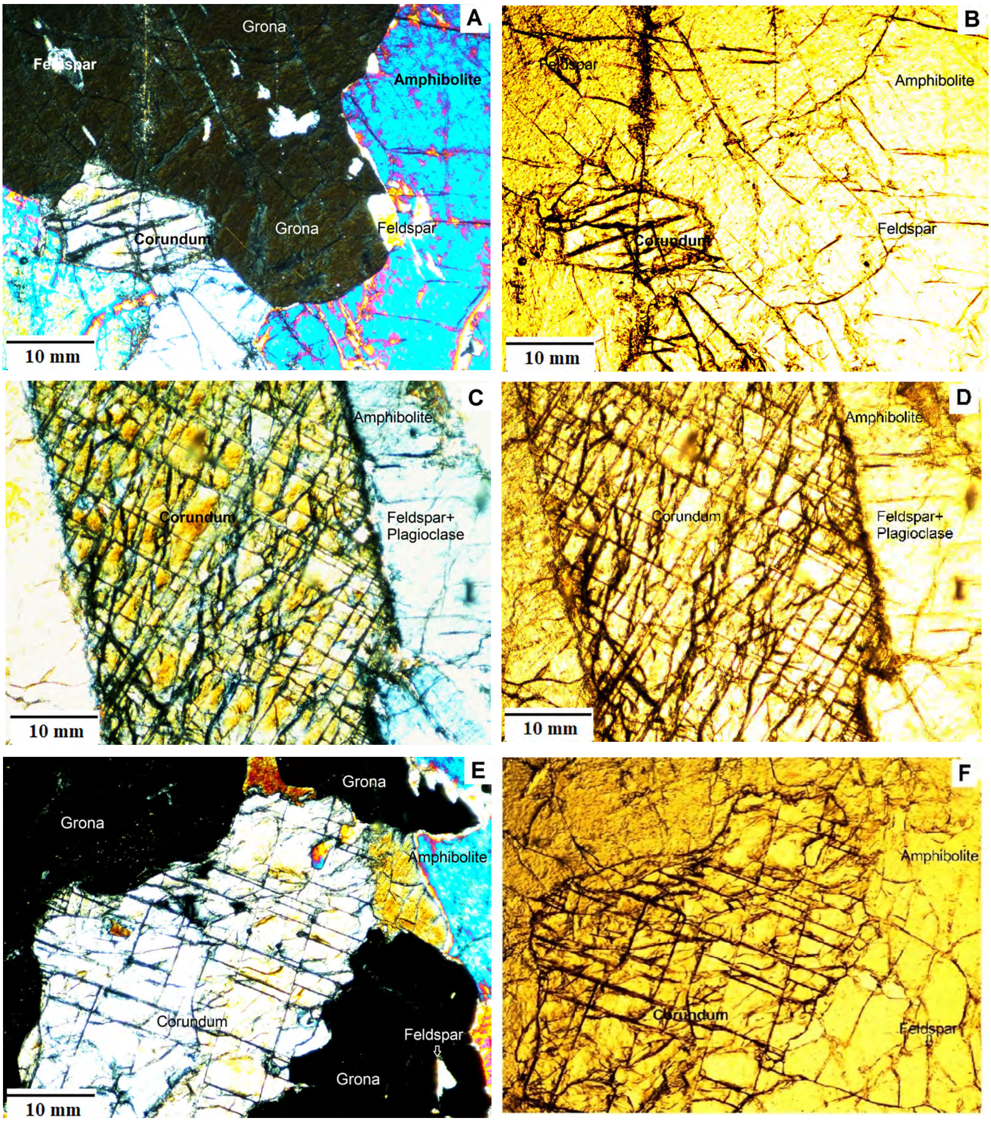

Fig. 4. Thin section images of ruby and host rock (a, c, e: +N, b, d, f: //N)

Rys. 4. Zdjęcia cienkich przekrojów rubinu i skały macierzystej (a, c, e: +N, b, d, f: //N) is mostly parted and cracked. Minerals surrounding them are amphibole minerals (crystallographic). Amphiboles are coarse-grained, cracked and with cleavage. Moreover, corundum, grona and feldspar minerals were encountered. Corundum and secondary muscovite enclaves take place in amphibole. Grain size ranges between 1.8 mm and 1.2 mm. Sizes of grona are variable between 2.1 and 4.5 mm. Sometimes, on large surfaces, amphibole enclaves in particular include corundum parts as enclaves. The grain size of these enclaves is fine and medium. Sometimes, very thin mineral parts are encountered. Plagioclase, as a feldspar mineral, have a medium-coarse grain at a size of 0.5–1.5 mm, in an oval shape, and surrounded by amphiboles. Local plagioclase twinning is encountered. Albite inclusions are infrequently observed. The opaque mineral is at a ratio of about 0.5%. The rock type is corundum and grona amphibolites (gabbro-originated rock) (Figure 4(e) and (f)).

4. Chemical properties

Table 1 shows the chemical analyses of host rock and ruby samples as the major oxide, trace elements, and rare earth metals. Chemical analyses of the host rock indicate an ultrabasic rock group. The mineral composition obtained from petrographic analyses and textural

Table 1. Main oxide, trace elements and rare earth element amounts according to chemical analyses results of Doğanşehir ruby and host rock

Tabela 1. Ilości głównych tlenków, pierwiastków śladowych i pierwiastków ziem rzadkich zgodnie z wynikami analiz chemicznych rubinu Doğanşehir i skały macierzystej

Oxides (wt%)	Host Rock (Amphibolite)			Ruby		
	1	2	3	1	2	3
SiO_2	43.80	43.21	42.40	0.43	0.62	0.52
Al_2O_3	20.50	26.20	18.45	98.70	90.40	90.45
Fe_2O_3	4.47	2.76	4.49	0.12	0.85	0.85
MgO	13.45	10.37	13.15	0.15	0.12	0.12
CaO	13.04	13.50	12.50	0.14	0.20	0.30
Na_2O	2.17	0.96	2.08	<0.01	0.02	0.02
K_2O	0.22	0.03	0.18	0.01	<0.01	<0.01
TiO_2	0.07	0.04	0.08	0.27	0.01	0.01
P_2O_5	0.01	0.01	0.03	0.01	<0.01	<0.01
MnO	0.07	0.04	0.06	0.12	<0.01	<0.01
Cr_2O_3	0.11	0.29	0.11	0.32	0.24	0.24
LOI	2.09	2.59	2.40	0.38	1.09	1.09

Oxides (wt%)	Host Rock (Amphibolite)			Ruby		
	1	2	3	1	2	3
Trace elements (ppm)						
Ni	464	615	476	14	1860	1796
Ba	63	44	79	3.7	4.7	4.6
Co	66	100	67	1.9	1.9	1.7
Cs	0.08	0.01	0.07	0.06	0.01	0.01
Ga	10.2	13.3	10.8	35	21.4	20.4
Hf	0.3	0.3	0.3	15.8	0.3	0.3
Nb	0.5	0.4	0.3	1.2	<0.2	<0.2
Rb	2.2	1.2	2.3	0.7	0.2	0.2
Sr	221	261	242	9.8	12.3	11.3
Ta	0.1	0.2	0.1	<0.1	<0.1	<0.1
Th	0.07	0.07	0.12	<0.05	<0.05	<0.05
U	0.39	<0.05	0.39	<0.05	<0.05	<0.05
V	22	<5	25	<5	<5	<5
W	174	518	187	2	4	4
Zr	17	16	15	<0.5	13	13
Zn	21	13	22	5	193	192
Y	2.1	1	1.7	160	<0.5	<0.5
Rare earth elements (ppm)						
La	1	2.1	4.3	<0.5	<0.5	<0.5
Ce	1.3	2.8	5.9	<0.5	<0.5	<0.5
Pr	0.15	0.25	0.52	0.05	<0.03	<0.03
Nd	0.7	0.8	1.7	0.2	0.1	0.1
Sm	0.19	0.13	0.24	0.05	<0.03	<0.03
Eu	0.16	0.14	0.16	<0.03	<0.03	<0.03
Gd	0.33	0.15	0.33	<0.05	<0.05	<0.05
Tb	0.05	0.02	0.03	<0.01	<0.01	<0.01
Dy	0.37	0.17	0.28	<0.05	<0.05	<0.05
Ho	0.07	0.04	0.06	0.01	<0.01	<0.01
Er	0.23	0.13	0.18	0.03	<0.03	<0.03
Tm	0.02	0.01	0.02	<0.01	0.02	0.02
Yb	0.21	0.12	0.16	<0.03	<0.03	<0.03
Lu	0.003	0.002	0.03	<0.01	<0.01	<0.01

features is coherent. According to a comparative assessment of host rock ruby samples concerning trace elements, ruby contains more Ni, Ga and Zn but less Zr, Ba, Co, V, W and Sr. Ruby samples are poorer concerning rare earth elements like Nd, Sm, La, Ce, Dy and Yb compared to the host rock. Host rocks including ruby are rich in Al and Ca and contain Cr (up to 0.29%) in significant amounts. According to geochemical analyses, ruby crystals contain 0.43–0.62% SiO_2, 90.40–98.70% of Al_2O_3, 0.12–0.85% of Fe_2O_3, and 0.24–0.32% of Cr_2O_3. Furthermore, chemical analyses of the host rock gave 42.40–43.80% of SiO_2, 18.45–26.2% of Al_2O_3, 2.76–4.49% of Fe_2O_3, 0.96–2.17% of Na_2O, 10.65–13.45% of MgO, 12.5–15.0% of CaO and 0.11–0.29% of Cr_2O_3.

5. Gemological properties of ruby

Rubies are available in the field as small size visible crystals of pink and red. Rubies are observed at sizes of 30 × 50 mm mostly having a specific habitus while smaller crystals are present in sizes of 2 × 10 mm. During the field study, ruby-containing host rock samples were systematically collected from Göksun ophiolites occurring on an open surface in the field around Doğanşehir. Samples containing ruby alone and those containing minerals accompanying ruby were cut and polished to be used in gemological examinations (Figure 5(a)). Rubies embedded into minerals become visible in a more vivid red color under blue light. Figure 6b shows that rubies produce a more significant red color under blue light. Some crystals have a diamond shape and are in the form of fractured parts.

Color zoning is not a feature seen frequently in Doğanşehir rubies. In some pieces, zoning in the form of irregular color distribution known as the color vortex is observed rather than color zoning. Liquid (tassel) enclaves, artificial tube structures and mineral enclaves were determined in ruby crystals. Mineral enclaves could not be defined mostly due to the low permeability of rubies and they show asterism. Highlighted color features of the rubies examined in this study are similar to those of Tanzania rubies but some ruby crystals present darker colors. Macroscopic colors range from dark violet-like red to vivid light pink.

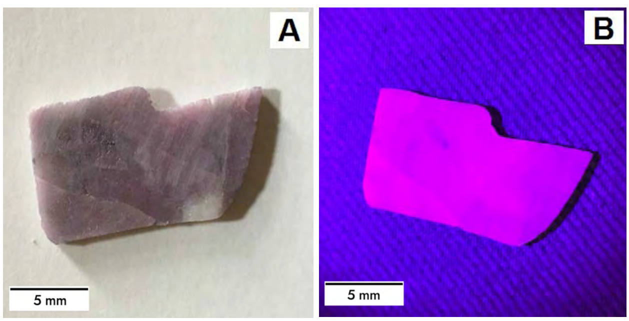

Fig. 5. Cut ruby (a) and images of ruby under blue light (b)

Rys. 5. Przecięty rubin (a) i obrazy rubinu w niebieskim świetle (b)

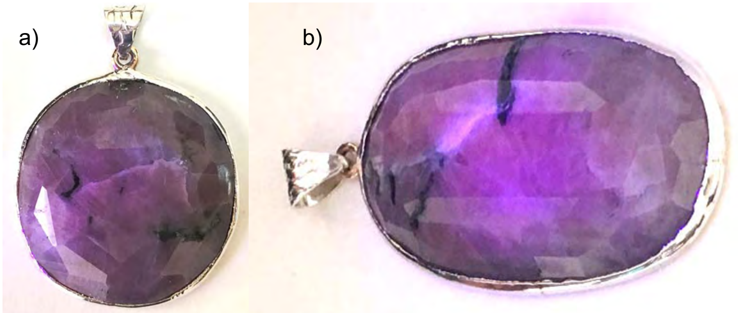

Fig. 6. Images of cut ruby samples

Rys. 6. Obrazy ciętych próbek rubinu

Various studies have been performed for many years on the physical properties of rubies and corundum (Grubessi and Marcon 1986; Hughes 1988; Duroc-Danner 2002; Rankin and Edwards 2003; Pisutha-Arnond et al. 2006; Sutherland and Abduriyim 2009; Bidny et al. 2010; Uz et al. 2018; Hughes and Vertriest 2022). Host rocks contain visible red rubies. Refractive index (1.762) and double refraction (0.008) values determined for Doğanşehir rubies are in the range of values reported for rubies in the general literature (Kane et al. 1991; Khoi et al. 2011). The specific density of ruby crystal is 4.01 g/cm^3, which is similar to the values reported for those from Tanzania, Myanmar, Vietnam and other manufacturers. Cut Doğanşehir ruby samples are seen in Figure 6(a) and (b). It was determined that Doğanşehir ruby is suitable for polishing and it is useful as a gemstone.

Results

It was determined that ruby mineralization in the ruby minefield under study resulted from the metamorphosis of amphibolites-hornblendites, a type of peridotite. General mineral paragenesis is ruby + hornblend, ruby + hornblend + feldspar, ruby + hornblend + garnet. Concerning color, three types of corundum rubies were determined. These are pink, pink + + red, and red. Ruby crystal sizes were determined up to 3–5 cm according to the field scale and 1.5 cm according to the polishing scale. Furthermore, rubies embedded in the mineral are visible. Ruby mineralizations have been detected from hills with an altitude of 1481 meters to altitudes at elevations 200 meters below this point. This suggests that ruby crystallization continues below the surface. Ruby ratios reach about 40% in samples on both thin-cut and polished surfaces. The ruby mineralization host rock is hard, massive and integrated. Göksun ophiolites, made up of garnet amphibolite, garnet mica schist, amphibolites, and meta serpentinite lithologies, surfaced around Doğanşehir. Ruby variety corundum takes place in Göksun ophiolites' hornblend + ortose + plagioclase + garnet mineral paragenesis. This mineral paragenesis indicates amphibolites facies' almandine-amphibolites sub-facies.

The geological environment and the first findings about rubies indicate that they are of a type depending on ophiolites and suggest that they resulted from metasomatic events.

Their most important features are their colors ranging from red to pink, their permeability ranging from low to medium, their crystal sizes ranging from medium to coarse, and the fact that they show lamel and deformation twinning. Crystal sizes range between 2 × 10 mm and 30 × 50 mm. Doğanşehir rubies are similar to Tanzania rubies in many aspects. Qualities of Doğanşehir rubies evidenced that they may be put in the same class as rubies of Tanzania formed depending on amphibolites. The available results indicate that Doğanşehir rubies have gemological and mineralogical parameters that enable them to compete with rubies from other countries. The examples of Doğanşehir rubies prepared by polishing and cutting show that these rubies may appear in the global market in the coming years. Doğanşehir rubies are suitable for cobacore cutting mostly in large sizes and amounts. Thus, it is a potential gemstone source. Samples which were prepared by polishing and cutting these rubies indicate their suitability as a gemstone. These initial findings are intended for only determining mineralogical, petrographic and gemological qualifications. Research on petrologic examinations, the usefulness of the ruby concerning gemology, its extraction from the host rock and its enrichment continues. It is planned to present this research in future studies.

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GEOLOGICAL, PETROGRAPHICAL, MINERALOGICAL, GEOCHEMICAL AND GEMOLOGICAL FEATURES OF MALATYA RUBIES

Keywords

corundum, gemology, gemstone, ruby, sapphire

Abstract

There are significant ruby formations across the world that have been commercialized. In Türkiye there are many mineralogical formation regions with gemological features of high quality. However, there is not enough information in the literature about the formation of ruby in Türkiye, and its usability as a precious stone. In contrast to previous studies, this paper was conducted to reveal the gemological properties of Doğanşehir (Malatya province) rubies and to investigate the usability of polished and cut ruby samples as gemstones. Ruby corundum formations of gemstone quality have recently been discovered in Göksun ophiolites in the Doğanşehir district of Türkiye. These ruby formations take place in greenish and grayish amphibolites in the Göksun ophiolites. The ruby crystals are observed in colors ranging from pink to red and sizes ranging between 2 × 10 mm and 30 × 50 mm. The tectonic position, geological environment, petrographic, mineralogical, geochemical, and gemological characteristics of Doğanşehir crystals indicate that they can be classified as rubies and can be likened to those gems formed in amphibolites in Tanzania. This indicates that Doğanşehir rubies have gemological and mineralogical parameters that are competitive with rubies existing in other places across the world after polishing and cutting. Examples of Doğanşehir rubies prepared by polishing and cutting show that these rubies may feature in the global market in the coming years. Doğanşehir rubies are suitable for COBACORE (community based comprehensive recovery) cutting mostly in large sizes and amounts. Thus, it is a potential gemstone source. Samples prepared by polishing and cutting indicate their suitability as gemstones.

CECHY GEOLOGICZNE, PETROGRAFICZNE, MINERALOGICZNE, GEOCHEMICZNE I GEMMOLOGICZNE RUBINÓW Z MALATYI

Słowa kluczowe

korund, gemmologia, kamień szlachetny, rubin, szafir

Streszczenie

Na całym świecie istnieją znaczące formacje rubinów, które zostały skomercjalizowane. W Turcji znajduje się wiele regionów formacji mineralogicznych o cechach gemmologicznych wysokiej jakości. Jednak w literaturze nie ma wystarczających informacji na temat powstawania rubinu w Turcji i jego przydatności jako kamienia szlachetnego. W przeciwieństwie do poprzednich badań, niniejsza praca miała na celu ujawnienie właściwości gemmologicznych rubinów z Doğanşehir (prowincja Malatya) oraz zbadanie przydatności wypolerowanych i ciętych próbek rubinu jako kamieni szlachetnych.

W ofiolitach Göksun w dystrykcie Doğanşehir w Turcji odkryto niedawno formacje korundu rubinowego o jakości kamieni szlachetnych. Te formacje rubinowe występują w zielonkawych i szarawych amfibolitach w ofiolitach Göksun. Kryształy rubinu występują w kolorach od różowego do czerwonego i rozmiarach od 2 × 10 mm do 30 × 50 mm. Położenie tektoniczne, środowisko geologiczne, właściwości petrograficzne, mineralogiczne, geochemiczne i gemmologiczne kryształów Doğanşehir wskazują, że można je zaliczyć do rubinów i porównać do klejnotów powstałych w amfibolitach w Tanzanii. Wskazuje to, że rubiny Doğanşehir mają parametry gemmologiczne i mineralogiczne, które po wypolerowaniu i cięciu są konkurencyjne w stosunku do rubinów występujących w innych miejscach na świecie. Przykłady rubinów Doğanşehir przygotowanych metodą polerowania i cięcia pokazują, że rubiny te mogą pojawić się na światowym rynku w nadchodzących latach. Rubiny Doğanşehir nadają się do cięcia COBACORE (kompleksowe odzyskiwanie oparte na społeczności), głównie w dużych rozmiarach i ilościach. Jest to zatem potencjalne źródło kamieni szlachetnych. Próbki przygotowane przez polerowanie i cięcie wskazują na ich przydatność jako kamieni szlachetnych.