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Unscientific Mining of Corundum at Gobbagurthi, Khammam, Telangana, India

Narayan Sangam¹ and Soundar Rajan²

1. Associate Professor, Vignan Institute of Technology & Science, Hyderabad. Telangana. India. sangam.narayan.narayan@gmail.com

2. Professor, Vignan Institute of Technology & Science, Hyderabad. Telangana. India dsr_j@yahoo.co.in

Abstract. Unscientific mining of *Industrial grade Corundum and gem variety, (gemstone ruby and semi-precious abrasive corundum)* is observed surrounding Lakshmipuram, Gobbagurthi, Donabanda and Singaraipalem areas of Khammam District of Andhra Pradesh. Corundum is found occurring in the Khammam Schist Belt., a northern extension of the Nellore Schist Belt of the Indian Peninsular Shield. Local entrepreneurs are involved in the mining of corundum since a long time. Both gem variety and industrial grade occurrences of corundum are observed as in-situ, float, and placer concentrations. Exploration of corundum is manifested in geomorphology, structure and lithology in this area which have proved to be very useful guides for understanding the various controls of corundum mineralization at Gobbagurthi as well as in surrounding areas of corundum occurrences in Khammam district.

Index Terms: Corundum, Mining, Gobbagurthi, Khammam.

Introduction

Ruby corundum is observed within Gobbagurthi and Donabanda in Khammam District, Andhra Pradesh. Unscientific exploitation of corundum has been observed for over few decades and unscientific open pit mining activity is observed around Gobbagurthi, Lakshmipuram and Wyra areas.

Lithology of the host rocks is an essential factor in the mineralization of Corundum in Khammam Schist Belt. The structural control in this area also plays an important role in the mineralization of corundum. The important area of corundum mineralization is close to the Wyra lake and the incoming drainage carry considerable quantities of transported corundum.

Semi-precious grade Ruby Corundum is noticed at Lakshmipuram, Gobbagurthi, Singaraipalem, Lalapuram, Tumallepalle, Wyra and adjoining locations of Khammam District, Andhra Pradesh. (17° 10' – 17° 20': 80° 15' - 80° 25')

Mode of occurrence of corundum:

Float, In-situ, and Placer occurrences are three different types, namely observed in the area of study.

Float occurrences are noticed in the field as colluviums mixed with pebbles of quartz. Unless the eyes are properly trained, identification of these deposits is very difficult.



Insitu occurrence of corundum in the field is seen in association with felsic and gneissic rocks. The contact zones of weak structural planes of amphibolites also show occurrence of corundum suggesting to be the controlling factor for localization of the mineral corundum. The contact zone between felsic rocks and garnetiferous amphibolites forms major insitu occurrences. (Fig.2)

Placer concentrations of corundum in the field are observed along the nalla courses. Panning of river alluvium on large scale is noticed and the recoveries are also encouraging. Corundum is seen along the culverts where prospecting pits amply justify the transportation of corundum from the upper reaches of the stream network. (Gobbagurti Hills). Generally, the quartzo-felsic rocks do not enclose corundum. Perhaps, the tectonic elements, which facilitated the emplacement of quartzo-felsic and related rocks such as aplites, pegmatites and tonalites must have also acted as carriers of corundum and localised them with desilicified rocks along the contact zones as insitu occurrences in the study area. (Fig.3&4)

Methods of Extraction/mining:

The common extraction practice for corundum in the study area is mostly **unscientific- strip quarrying** or pitting. Primitive open pit mining, burrow mining and rat hole mining has been carried out for the extraction of corundum in this area. (Fig.1)

Corundum mineral is collected by digging the soil in a depth range of 0.4 to 0.7m. Light Pink to Dark Purple corundum of translucent variety is picked by handpicking. Stray pieces of corundum are seen in the area between Tummalapalle on the West to Singaraipalem in the East and from Lakshmipuram in the North to Pallipadu in the South indicating enormous extraction activity.

The grain size of corundum is large and also small grains of corundum are picked up over gently raised outcrops of hornblende granulite. The detrital corundum occurs as worn-out crystals of 0.25 to 0.5 x 1.0 m in size, but well-developed prismatic crystals as big as 2cm x 4 cm are not uncommon indicating their liberation from the weathered rock without much transportation.

It is observed that the top layer of the soil (black soil) of thickness up to 0.15 m approximately is generally barren of corundum. Where the black soil is underlain by brownish secondary zone, consisting of very small fragments of sillimanite, ferruginous matter and quartz are observed in matrix of brown soil, which contain corundum. The thickness of this corundum zone varies from 0.15 to 0.30 m.

Prominent areas of extraction/mining activity:

NNE OF MEKALKUNTA:

Abandoned pits & dumps of about 30m x 60m in the area comprise quartz-sillimanite gneisses. Insitu corundum occurs in trenches at 1.50 m below the surface

SALEBANJAR AREA:

NW of Salebanjar and 5 Kms, S of Salebanjar, old workings 30 x 40m dumps comprise altered basic rocks and pelitic schists. Corundum is extracted from these dumps and perhaps the source could be the contact zone containing pelitic schists.

TUMMALAPALLE AREA:

Mined out dumps comprised of hypersthene / hornblende granulites and gneissic rocks. Corundum is extracted from this area and it is transparent to translucent in nature.

SINGRAIPALEM – LAKSHMIPURAM AREA:

South of Lakshmipuram village, old pits and dumps with altered basic rocks, white mica and acicular sillimanite is observed. One of the trenches exposes sillimanite corundum rock where the corundum sillimanite horizon starts at 2.20 m and continues up to 4.90 m in depth. One of the trenches exposes sillimanite corundum rock where the corundum sillimanite horizon starts at 2.20 m and continues up to 4.90 m in depth. (Narayan Sangam. & Pavanaguru, R. 2005)

LALAGUDA (Lallugudem):

Corundum is recovered from the soil by manual breaking, panning and washing. Distribution of corundum in host rock is irregular. Incidence of corundum is 2 to 3 % of host rock by weight in this area. Imperfect crystals (hexagonal) of corundum measuring 0.5 x 0.5 cms to 1.0 cm are observed. All the trenches used for corundum extraction are shallow with maximum 6 m depth.

PALLIPADU – LAKSHMIPURAM AREA:

Old workings of corundum extraction up to 8 m depth are observed. Pebble bed is the host horizon and contains corundum which exhibits brown to violet colour, with cleavage partings and is occasionally fractured. Corundum is mined by shallow pits and trenches. Placer accumulations of 10 cm thickness lying below a thick soil cover in the weathered mantle of 3 m is spread over a large area. 5-7 % of the pebble bed material is contained of corundum pieces.



Fig.1 OPEN PIT MINING



Fig.2 INSITU MINING



Fig.3 PANNING OF CORUNDUM



Fig.4 PANNING OF CORUNDUM

RESULTS AND CONCLUSIONS:

Corundum is collected by manual panning along the structurally controlled nallas (drainage) which indicates wide spread placer concentrations of corundum in this area.

The corundum occurrences here has attracted the attention of a number of prudent entrepreneurs since several years and exploratory mining is the order of the day.

Scientific method of extraction has not been observed in the field in these areas and open pit mining activity is noticed in these areas without proper understanding of the nature of mineralisation.

Mining is typically by open pit type. Typically, residual and placer deposits of corundum contain a higher proportion of gem corundum during stream transport which can be justified in the present study area.

Over few decades, unscientific exploitation of corundum and open pit mining activity without understanding the nature of mineralisation is observed in Gobbagurthi, Donabanda, Singraipalem, Lalapuram and Wyra areas.

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