India's International Trade of Four Specific Commodities in the Recent Past - Some Insights

Preface

The study uses trade indicators to analyse merchandise export and import data in a way that should be useful for the purpose of policy. The indicators provide a glimpse of the trade patterns of the world and the performance of India in comparison to various other countries. They have been used in the case of India's exports of **Artificial Corundum and Mica, including splitting: Mica Waste** and imports of **Amino & Phenolic Resins and Polyurethanes in Primary Forms** and **Copper Ore & Concentrates** to indicate the possible directions policy may take.

The data used in this study has been sourced from the Export Import Data Bank of thr DGCI&S, Department of Commerce, and Government of India and from the United Nations Comtrade Database. Introduction notes of each commodities has been sourced from the various sights –viz Wikipedia, Britannica, The Economic Times etc.

Computations are based on data at ITC-HS four-digit level (ITC-HS Code-2818 & 2525 for export and 3909 & 2603 for import) and the latest finalized data available on the UN Comtrade Database up to year 2022 and on the DGCI&S Database up to August'2023. So, trends from 2019 to 2022 have been shown when we extract the data from UN Comtrade and from 2019 to 2022 have been shown when we extract the data from DGCIS Data base.

In this report, we will see various analysis and aspects of India's Precious as well as International export trade of Artificial Corundum and Mica, including splitting: Mica Waste and imports of Amino & Phenolic Resins and Polyurethanes in Primary Forms and Copper Ore & Concentrates. We will use both the 4 digit Commodity codes, for our analysis, as appropriate.

Trends in India's as well as International Trade i.e. Exports and Imports of above four Commodities are given below in different tables :

- Table 1 : India's top 10 Export destination of Artificial Corundum with their shares in percentage.
- Table 2 : World's top 10 Exporters of Artificial Corundum with their shares in percentage.
- Table 3 : World's top 10 Importers of Artificial Corundum with their shares in percentage.
- Annex- I : Top 3 sources of Artificial Corundum of World's top 3 Importers.
- Table 4 : India's top 10 destination of Mica, including splitting: Mica waste with their shares in percentage.
- Table 5 : World's top 10 Exporters of Mica, including splitting: Mica waste with their shares in percentage.
- Table 6 : World's top 10 Importers of Mica, including splitting: Mica waste with their shares in percentage.
- Annex-II : Top 3 sources of Mica, including splitting: Mica waste of World's top 3 Importers.
- Table 7 : India's top10 Sources of Amino & Phenolic Resins and Polyurethanes in Primary Forms with their shares in percentage.
- Table-8: World's top 10 Importers of Amino & Phenolic Resins and Polyurethanes in Primary Forms with their shares in percentage.
- Table 9 : India's top 10 Sources of Copper Ore & Concentrates with their shares in percentage.
- Table 10 : World's top 10 Importers of Copper Ore & Concentrates with their shares in percentage

EXPORT
Artificial Corundum

Corundum is a crystalline form of aluminium oxide (Al_2O_3) typically containing traces of iron, titanium, vanadium and chromium. It is a rock-forming mineral. It is a naturally transparent material, but can have different colours depending on the presence of transition metal impurities in its crystalline structure. Corundum has two primary gem varieties: ruby and sapphire. Rubies are red due to the presence of chromium, and sapphires exhibit a range of colours depending on what transition metal is present. A rare type of sapphire, padparadscha sapphire, is pink-orange.

The name "corundum" is derived from the Tamil-Dravidian word *kurundam* (ruby-sapphire).

Because of corundum's hardness (pure corundum is defined to have 9.0 on the Mohs scale), it can scratch almost all other minerals. It is commonly used as an abrasive on sandpaper and on large tools used in machining metals, plastics, and wood. Emery, a variety of corundum with no value as a gemstone, is commonly used as an abrasive. It is a black granular form of corundum, in which the mineral is intimately mixed with magnetite, hematite, or hercynite. In addition to its hardness, corundum has a density of 4.02 g/cm^3 (251 lb/cu ft), which is unusually high for a transparent mineral composed of the low-atomic mass elements aluminium and oxygen.

Corundum occurs as a mineral in mica schist, gneiss, and some marbles in metamorphic terranes. It also occurs in low-silica igneous syenite and nepheline syenite intrusives. Other occurrences are as masses adjacent to ultramafic intrusives, associated with lamprophyre dikes and as large crystals in pegmatites. It commonly occurs as a detrital mineral in stream and beach sands because of its hardness and resistance to weathering. The largest documented single crystal of corundum measured about 65 cm × 40 cm × 40 cm (26 in × 16 in × 16 in), and weighed 152 kg (335 lb). The record has since been surpassed by certain synthetic boules.

Corundum for abrasives is mined in Zimbabwe, Pakistan, Afghanistan, Russia, Sri Lanka, and India. Historically it was mined from deposits associated with dunites in North Carolina, US, and from a nepheline syenite in Craigmont, Ontario.[6] Emery-grade corundum is found on the Greek island of Naxos and near Peekskill, New York, US. Abrasive corundum is synthetically manufactured from bauxite.

Four corundum axes dating to 2500 BC from the Liangzhou culture have been discovered in China.
The Verneuil process allows the production of flawless single-crystal sapphire and ruby gems of much larger size than normally found in nature. It is also possible to grow gem-quality synthetic corundum by flux-growth and hydrothermal synthesis. Because of the simplicity of the methods involved in corundum synthesis, large quantities of these crystals have become available on the market at a fraction of the cost of natural stones.[16]

Apart from ornamental uses, synthetic corundum is also used to produce mechanical parts (tubes, rods, bearings, and other machined parts), scratch-resistant optics, scratch-resistant watch crystals, instrument windows for satellites and spacecraft (because of its transparency in the ultraviolet to infrared range), and laser components. For example, the KAGRA gravitational wave detector's main mirrors are 23 kg (50 lb) sapphires, and Advanced LIGO considered 40 kg (88 lb) sapphire mirrors. Corundum has also found use in the development of ceramic armour thanks to its high hardiness.

In 1837, Marc Antoine Gaudin made the first synthetic rubies by reacting alumina at a high temperature with a small amount of chromium as a colourant. In 1847, J. J. Ebelmen made white synthetic sapphires by reacting alumina in boric acid. In 1877, Frenic and Freil made crystal corundum from which small stones could be cut. Frimy and Auguste Verneuil manufactured artificial ruby by fusing BaF_2 and Al_2O_3 with a little chromium at temperatures above 2,000 °C (3,630 °F). In 1903, Verneuil announced that he could produce synthetic rubies on a commercial scale using this flame fusion process.

These are broadly classified under **H.S. Code-2818**

Table - 1

India's Top 10 destination of Artificial Corundum (H.S Code-2818)

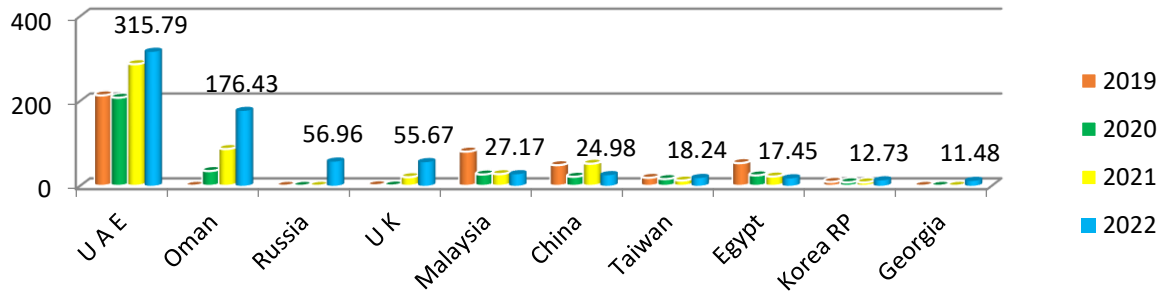
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	U A E	213.17	41.57	207.66	52.69	286.88	48.42	315.79	40.61
2.	Oman	0.17	0.03	34.82	8.84	86.79	14.65	176.43	22.69
3.	Russia	0.09	0.02	0.00	0.00	0.00	0.00	56.96	7.33
4.	U K	1.27	0.25	0.68	0.17	20.39	3.44	55.67	7.16
5.	Malaysia	80.69	15.74	26.72	6.78	27.63	4.66	27.17	3.49
6.	China	48.69	9.49	21.36	5.42	52.10	8.79	24.98	3.21
7.	Taiwan	18.81	3.67	15.96	4.05	12.43	2.10	18.24	2.35
8.	Egypt	53.52	10.44	24.54	6.23	21.89	3.70	17.45	2.24
9.	Korea RP	9.27	1.81	8.25	2.09	8.02	1.35	12.73	1.64
10.	Georgia	0.00	0.00	0.00	0.00	0.00	0.00	11.48	1.48
	Others	87.12	16.99	54.10	13.73	76.31	12.88	60.69	7.80
	Total	512.78	100	394.09	100	592.46	100	777.58	100

Source: DGCI&S.

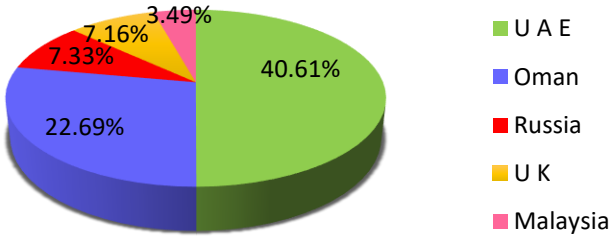
Note : India's Export including re-export

Major destinations of Artificial Corundum from India from 2019-2022 **(Values in million USD)**

Data label given on the basis of 2022



India's top 5 major destinations of Artificial Corundum by percentage in 2022:



Overall the export of Artificial Corundum from India were valued at US $ 777.58 Million in 2022. Year over year, the value of Corundum export from India rise by 31.24% from 2021 to 2022. The export reached an all time high of US $ 777.58 Million during the year 2022. In 2022 India's Corundum export value to UAE is around US $ 315.79 Million, which holds the top position with the share of 40.61% of the total export from India. With the value of US $ 176.43 Million, Oman takes runner up position in the global importers of Indian Artificial Corundum with 22.69% share and Russia (US $ 56.96 M) was the 3rd largest destination of Artificial Corundum from India with 7.33% share of India's total export of it in that year.

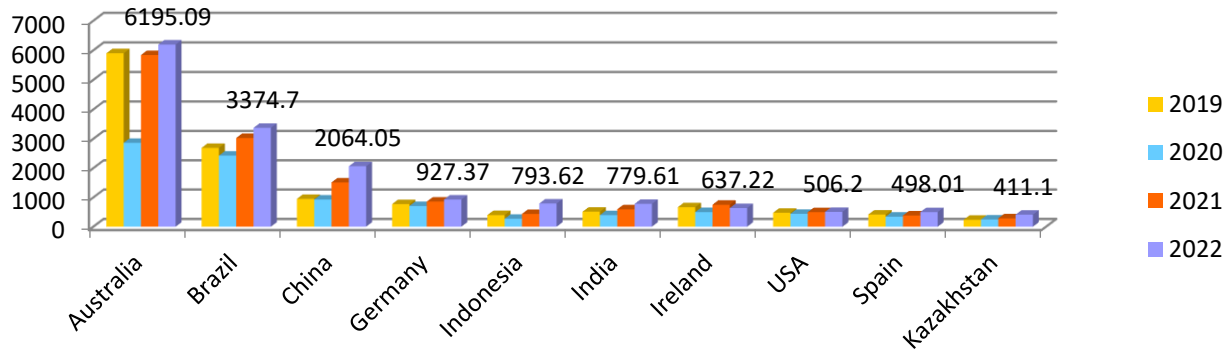
Table-2

World's Top 10 exporter of Artificial Corundum (H.S Code-2818)

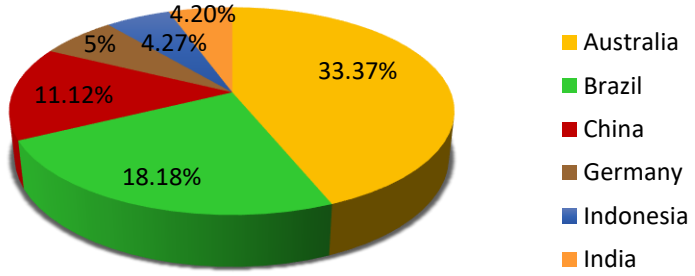
Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Australia	5900.68	35.43	2862.54	24.05	5838.69	33.01	6195.09	33.37
2.	Brazil	2689.92	16.15	2425.24	20.38	3027.22	17.11	3374.70	18.18
3.	China	948.83	5.70	929.05	7.81	1511.80	8.55	2064.05	11.12
4.	Germany	770.87	4.63	707.69	5.95	857.35	4.85	927.37	5.00
5.	Indonesia	396.54	2.38	270.86	2.28	435.91	2.46	793.62	4.27
6.	**India**	**512.48**	**3.08**	**394.20**	**3.31**	**593.42**	**3.35**	**779.61**	**4.20**
7.	Ireland	666.35	4.00	498.86	4.19	749.68	4.24	637.22	3.43
8.	USA	477.26	2.87	440.65	3.70	495.80	2.80	506.20	2.73
9.	Spain	415.72	2.50	342.72	2.88	384.11	2.17	498.01	2.68
10.	Kazakhstan	236.04	1.42	245.98	2.07	285.15	1.61	411.10	2.21
	Others	3639.90	21.86	2782.95	23.38	3509.50	19.84	2377.24	12.81
	Total	16654.59	100	11900.75	100	17688.63	100	18564.22	100

Source: UN Comtrade

Major Artificial Corundum exporters of world from 2019 to 2022 **(Values in million USD):**
Data label given on the basis of 2022



Country wise export trends in world's leading Artificial Corundum in 2022



In 2022, global Artificial Corundum export trade was of US $ 18.56 Billion. In that year it was increased by 4.95%, from US $ 17.69 Billion of 2021 to US $ 18.56 Billion of 2022. In value terms, Australia (US $ 6.19 B) remains the largest artificial corundum supplier worldwide, comprising 33.37% of global exports in 2022. The second position in the ranking was occupied by Brazil (US $ 3.37 B), with a 18.18% share of global exports. It was followed by China (US $ 2.06 B), with a 11.12% share of global total. In that year **India** (US $ 779.61 M) remains the 6th largest exporter in the world with a 4.20% share of world export of Artificial Corundum.

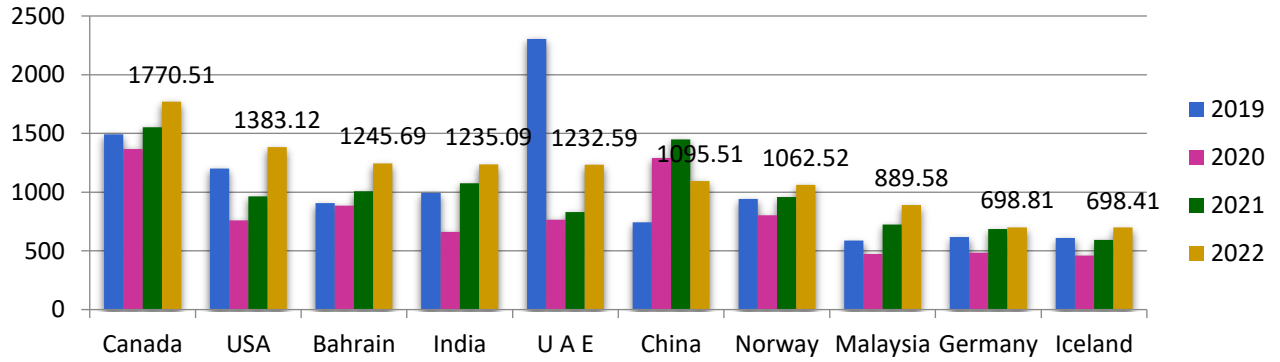
Table-3

World's top 10 Importers of Artificial Corundum (H.S Code-2818)

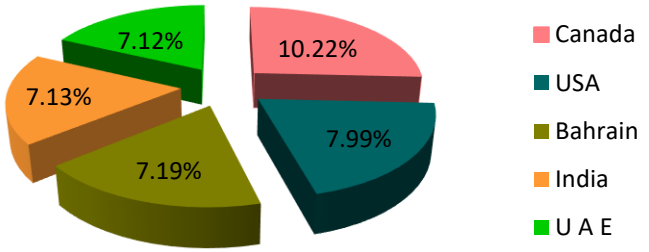
Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Canada	1491.82	7.94	1368.08	9.50	1553.09	8.60	1770.51	10.22
2.	USA	1201.89	6.40	758.74	5.27	964.30	5.34	1383.12	7.99
3.	Bahrain	905.45	4.82	883.86	6.13	1006.32	5.57	1245.69	7.19
4.	**India**	**992.95**	**5.29**	**660.75**	**4.59**	**1074.48**	**5.95**	**1235.09**	**7.13**
5.	U A E	2303.25	12.26	766.04	5.32	830.12	4.60	1232.59	7.12
6.	China	742.42	3.95	1290.33	8.96	1450.13	8.03	1095.51	6.33
7.	Norway	940.67	5.01	803.70	5.58	957.71	5.30	1062.52	6.13
8.	Malaysia	587.82	3.13	474.11	3.29	723.25	4.01	889.58	5.14
9.	Germany	617.91	3.29	485.45	3.37	686.80	3.80	698.81	4.03
10.	Iceland	609.12	3.24	458.58	3.18	592.89	3.28	698.41	4.03
	Others	8394.00	44.68	6458.31	44.82	8217.69	45.51	6008.49	34.69
	Total	18787.31	100	14407.94	100	18056.77	100	17320.33	100

Source : UN Comtrade

Leading Artificial Corundum importers of world from 2019 to 2022 **(Values in million USD):**
Data label given on the basis of 2022



Country wise import trends in world's Artificial Corundum by percentage in 2022 :

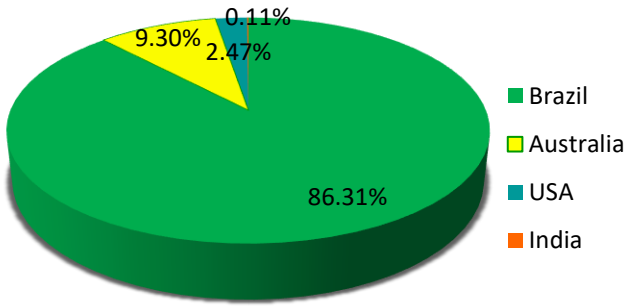


The Artificial Corundum imports amounted to US $ 17.32 Billion in 2022. The total import value decreased at 4.08% from the year 2021. In value terms, Canada (US $ 1.77 B), USA (US $ 1.38 B) and Bahrain (US $ 1.24 B) appeared to be the countries with the highest levels of imports in 2022 with 10.22%, 7.99% and 7.19% share of global total import of Artificial Corundum respectively , together comprising 25.40% of global imports. In that year **India** was the 4th largest importer of it with US $ 1.23 Billion of Artificial Corundum purchased from the world, comprising 7.13% share of global import of Artificial Corundum.

Annexure-1

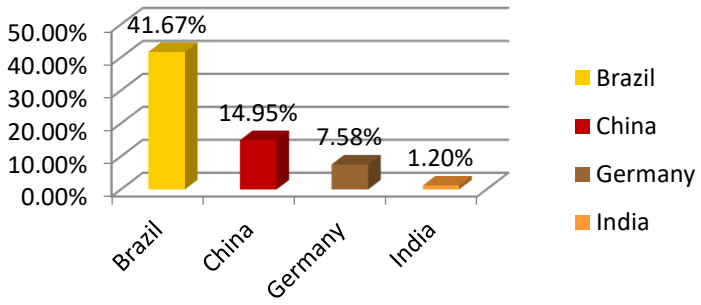
Major sources of world's top three importers of Artificial Corundum (H.S Code-2818)

i) Top 3 Sources of Artificial Corundum to Canada in 2022 by percentage:



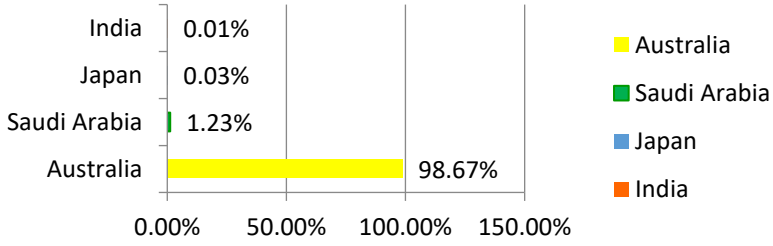
Brazil was the largest source country of Artificial Corundum with 86.31% share of Artificial Corundum exported to Canada in 2022. The 2nd and 3rd largest source of the commodity to Canada was Australia (9.30%) and USA(2.47%) in that year. India's share was only 0.11% **(Source : UN Comtrade)**

ii) Top 3 Sources of Artificial Corundum USA in 2022 by percentage:



Brazil was the primary source of Artificial Corundum of USA. USA imported 41.67% share of Artificial Corundum from Brazil in 2022, followed by China (14.95%) and Germany (7.58%). India's contribution was only 1.20%. **(Source : UN Comtrade)**

iii) Top 3 Sources of Artificial Corundum to Bahrain in 2022 by percentage:



Bahrain imports 98.67% share of Artificial Corundum from Australia in 2022. Saudi Arabia and Japan were 2nd and 3rd major source countries of the Artificial Corundum with 1.23% and 0.03%% share respectively to Bahrain in that year. India exported only 0.01% share of Bahrain's total import in that year. **(Source : UN Comtrade)**

Mica; including splitting: Mica Waste

Micas are a group of silicate minerals whose outstanding physical characteristic is that individual mica crystals can easily be split into extremely thin elastic plates. This characteristic is described as perfect basal cleavage. Mica is common in igneous and metamorphic rock and is occasionally found as small flakes in sedimentary rock. It is particularly prominent in many granites, pegmatites, and schists, and "books" of mica several feet across have been found in some pegmatites.

Micas are used in products such as drywalls, paints, fillers, especially in parts for automobiles, roofing and shingles, as well as in electronics. The mineral is used in cosmetics and food to add "shimmer" or "frost." The earliest use of mica has been found in cave paintings created during the Upper Paleolithic period (40,000 BC to 10,000 BC).

The mica group is composed of 37 phyllosilicate minerals. All crystallize in the monoclinic system, with a tendency towards pseudohexagonal crystals, and are similar in structure but vary in chemical composition. Micas are translucent to opaque with a distinct vitreous or pearly luster, and different mica minerals display colors ranging from white to green or red to black. Deposits of mica tend to have a flaky or platy appearance.

The crystal structure of mica is described as *TOT-c*, meaning that it is composed of parallel *TOT* layers weakly bonded to each other by cations (*c*). The *TOT* layers in turn consist of two tetrahedral sheets (*T*) strongly bonded to the two faces of a single octahedral sheet (*O*). It is the relatively weak ionic bonding between *TOT* layers that gives mica its perfect basal cleavage.

The tetrahedral sheets consist of silica tetrahedra, each silicon ion surrounded by four oxygen ions. In most micas, one in four silicon ions is replaced by an aluminium ion, while half the silicon ions are replaced by aluminium ions in brittle micas. The tetrahedra each share three of their four oxygen ions with neighbouring tetrahedra to produce a hexagonal sheet. The remaining oxygen ion is available to bond with the octahedral sheet.

India is the largest producer and exporter of mica in the world. Mica deposits mainly occur in Jharkhand, Bihar, Andhra Pradesh and Rajasthan.

. Mica's value is based on its unique physical properties: the crystalline structure of mica forms layers that can be split or delaminated into thin sheets usually causing foliation in rocks. These sheets are chemically inert, dielectric, elastic, flexible, hydrophilic, insulating, lightweight, platy, reflective, refractive, resilient, and range in opacity from transparent to opaque. Mica is stable when exposed to electricity, light, moisture, and extreme temperatures. It has superior electrical properties as an insulator and as a dielectric, and can support an electrostatic field while dissipating minimal energy in the form of heat; it can be split very thin (0.025 to 0.125 millimeters or thinner) while maintaining its electrical properties, has a high dielectric breakdown, is thermally stable to 500 °C (932 °F), and is resistant to corona discharge. Muscovite, the principal mica used by the electrical industry, is used in capacitors that are ideal for high frequency and radio frequency. Phlogopite mica remains stable at higher temperatures and is used in applications in which a combination of high-heat stability and electrical properties is required. Muscovite and phlogopite are used in sheet and ground forms.

Wet-ground mica, which retains the brilliance of its cleavage faces, is used primarily in pearlescent paints by the automotive industry. Many metallic-looking pigments are composed of a substrate of mica coated with another mineral, usually titanium dioxide (TiO_2).

Mica Sheet is a versatile and durable material widely used in electrical and thermal insulation applications. It exhibits excellent electrical properties, heat resistance, and chemical stability. Sheet mica is used principally in the electronic and electrical industries. Its usefulness in these applications is derived from its unique electrical and thermal properties and its mechanical properties, which allow it to be cut, punched, stamped, and machined to close tolerances. Specifically, mica is unusual in that it is a good electrical insulator at the same time as being a good thermal conductor.

These are broadly classified under **H.S. Code-2525.**

Table - 4

India's Top 10 destination of Mica, including splitting; Mica Waste (HS Code –2525)

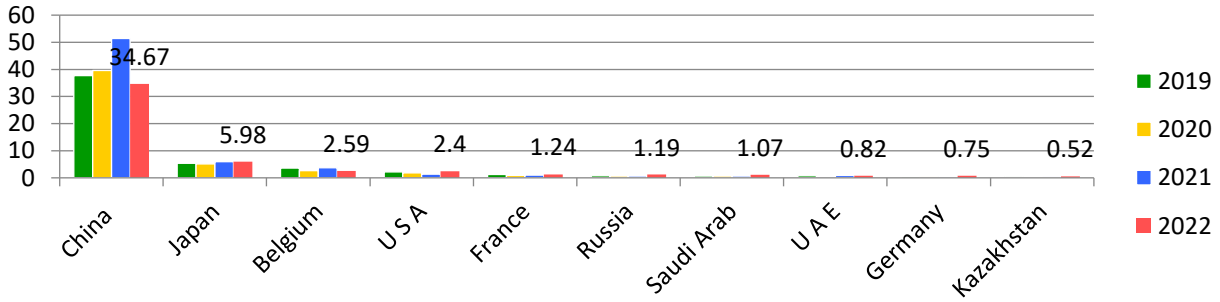
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	37.70	65.03	39.60	69.78	51.36	71.95	34.67	62.79
2.	Japan	5.32	9.18	5.10	8.98	5.93	8.31	5.98	10.84
3.	Belgium	3.60	6.20	2.61	4.60	3.77	5.28	2.59	4.70
4.	U S A	2.21	3.81	1.89	3.32	1.38	1.94	2.40	4.35
5.	France	1.19	2.05	0.89	1.56	0.99	1.38	1.24	2.24
6.	Russia	0.73	1.25	0.66	1.16	0.61	0.85	1.19	2.16
7.	Saudi Arab	0.64	1.10	0.71	1.24	0.60	0.84	1.07	1.94
8.	U A E	0.75	1.29	0.32	0.56	0.83	1.17	0.82	1.48
9.	Germany	0.53	0.91	0.39	0.70	0.58	0.82	0.75	1.35
10.	Kazakhstan	0.44	0.75	0.31	0.55	0.41	0.58	0.52	0.95
	Others	4.88	8.42	4.28	7.54	4.91	6.88	3.97	7.19
	Total	57.97	100	56.75	100	71.38	100	55.21	100

Source: DGCI&S

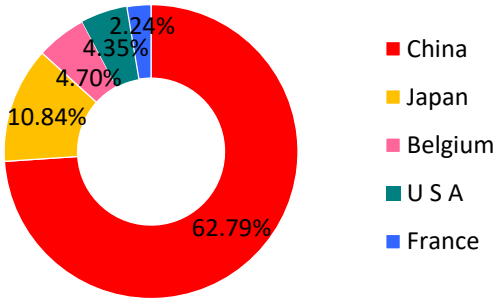
Note : India's Export including re-export

Leading Mica importers from India from 2019-2022 **(Values in million USD)**

Data label given on the basis of 2022



India's top 5 major destinations of Mica by percentage India in 2022:



In 2022, India exported Mica to 92 countries with a combined value of US $ 55.21 Million which was US $ 71.38 Million in 2021. Overall the export of Mica from India fell by -22.65% from 2021 to 2022. In value term India's Mica export to China is around US $ 34.67 Million, which holds the top position with the share of 62.79% of the total export value of of India in 2022. With the value of US $ 5.98 Million or 10.84% share, Japan takes runner up position in the global importers of Mica from India in 2022 which was followed by Belgium (US $ 2.59 M) takes 3rd position in ranking with 4.70% share of India's total export of Mica in 2022.

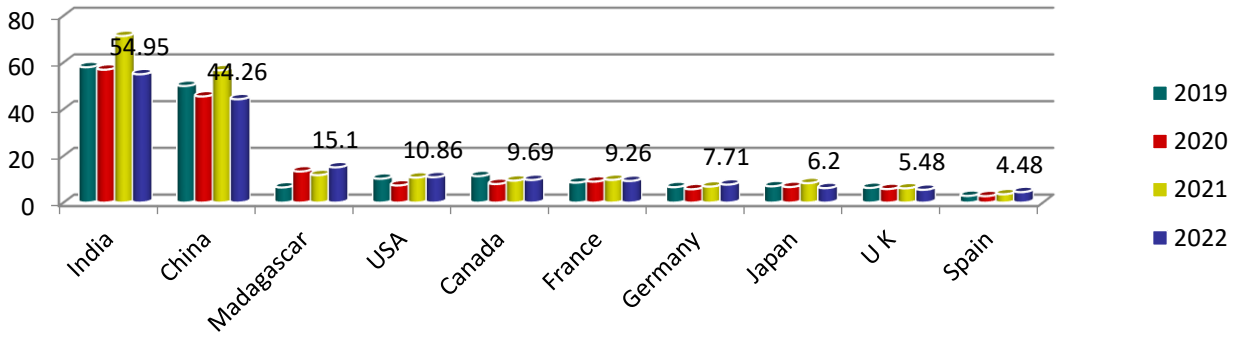
Table - 5

World's Top 10 exporter of Mica, including splitting; Mica Waste (HS Code –2525)

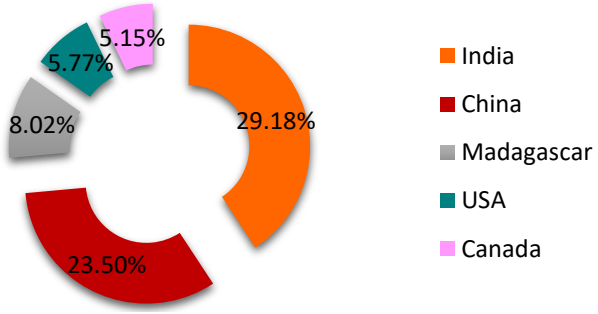
Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	India	57.96	30.73	56.90	27.79	71.32	21.84	54.95	29.18
2.	China	49.93	26.47	45.45	22.20	56.67	17.36	44.26	23.50
3.	Madagascar	6.48	3.44	13.32	6.51	11.76	3.60	15.10	8.02
4.	USA	10.22	5.42	7.33	3.58	10.71	3.28	10.86	5.77
5.	Canada	11.32	6.00	7.96	3.89	9.41	2.88	9.69	5.15
6.	France	8.56	4.54	8.99	4.39	9.73	2.98	9.26	4.92
7.	Germany	6.60	3.50	5.71	2.79	6.85	2.10	7.71	4.10
8.	Japan	6.97	3.70	6.66	3.25	8.33	2.55	6.20	3.29
9.	U K	6.28	3.33	5.79	2.83	6.10	1.87	5.48	2.91
10.	Spain	2.87	1.52	2.76	1.35	3.56	1.09	4.48	2.38
	Others	21.40	11.35	43.84	21.42	132.03	40.44	20.33	10.80
	Total	188.60	100	204.71	100	326.48	100	188.31	100

Source: UN Comtrade

Leading Mica, Mica Waste exporters of world from 2019 to 2022 **(Values in million USD)**
Data label given on the basis of 2022



World's leading Mica, Mica Waste exporters by percentage in 2022:



Global sales from Mica, Mica Waste exports by all countries totalled US $ 188.3 Million in 2022. Overall, the value of Mica, Mica Waste exports decreased by 42.33% for all exporting countries from 2021 when Mica, Mica Waste shipments were US $ 326.48 Million. The global export of Mica, Mica waste reached an all time high of US $ 326.48 Million during the year 2021. In 2022 **India** (US $ 54.95 M) remains the largest Mica, Mica Waste supplier worldwide, comprising 29.18% of global exports, which was followed by China (US $ 44.26M) and Madagascar(US $ 15.10 M) with 23.50% and 8.02% share global total in 2022 respectively.

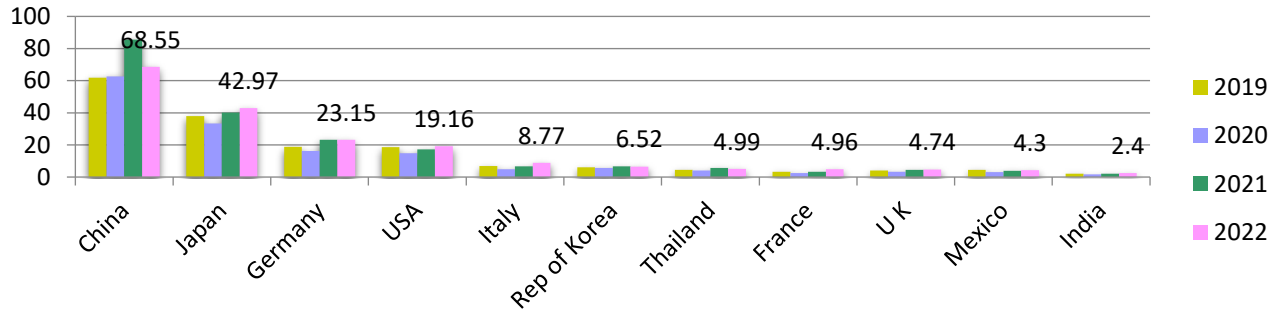
Table - 6

World's Top 10 Importer of Mica, including splitting; Mica Waste (HS Code –2525))

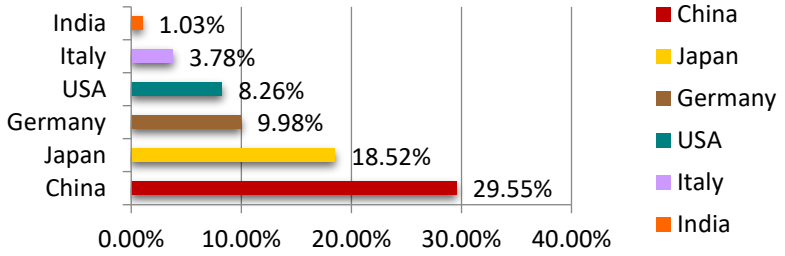
Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	61.74	29.15	62.71	31.82	85.54	33.01	68.55	29.55
2.	Japan	38.00	17.94	33.30	16.89	40.07	15.47	42.97	18.52
3.	Germany	18.75	8.85	16.30	8.27	23.10	8.91	23.15	9.98
4.	USA	18.68	8.82	14.77	7.50	17.28	6.67	19.16	8.26
5.	Italy	6.91	3.26	4.81	2.44	6.63	2.56	8.77	3.78
6.	Rep of Korea	6.03	2.85	5.62	2.85	6.57	2.54	6.52	2.81
7.	Thailand	4.54	2.14	4.14	2.10	5.66	2.18	4.99	2.15
8.	France	3.18	1.50	2.56	1.30	3.28	1.27	4.96	2.14
9.	U K	4.08	1.93	3.32	1.68	4.40	1.70	4.74	2.04
10	Mexico	4.41	2.08	3.12	1.58	3.81	1.47	4.30	1.85
11.	**India**	**2.02**	**0.95**	**1.67**	**0.85**	**2.04**	**0.79**	**2.40**	**1.03**
	Others	43.46	20.52	44.78	22.72	60.71	23.43	41.52	17.89
	Total	211.80	100	197.10	100	259.10	100	232.02	100

Source :UNComtrade

Leading importers Cotton not carded or combed of world from 2019 to 2022 **(Values in million USD)**
Data label given on the basis of 2022



Country wise import trends in world's Cotton, not carded or combed importers by percentage in 2022 :

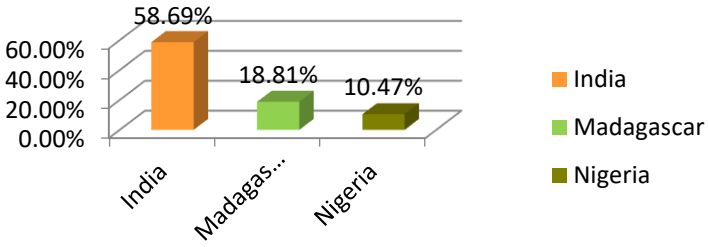


In value terms, Mica, Mica Waste imports totalled US $ 232.02 Million in 2022. Overall, mica imports indicate a relatively decreased by 10.45% from the previous year. Global mica import peaked of US $ 259.10 Million in 2021. however, in 2022, it failed to regain its strength. In value terms, with US $ 68.55 Million China constitutes the largest market for imported mica worldwide, making up 29.55% of global imports. The second position in the ranking was occupied by Japan(US $ 42.97 M), with the share of 18.52% of global imports. It was followed by Germany (US $ 23.15 M), with the share of 9.98%. In that year **India** imported US $ 2.40 Million worth of Mica and constitutes the 11th largest importer of it in the world with 1.03% share of global total.

Annexure-II

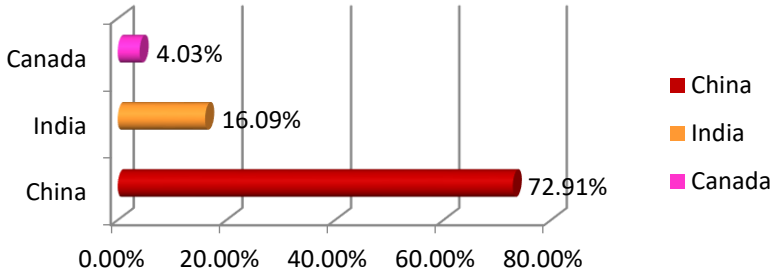
Major Sources of world's top three importers of Mica, Mica Waste (HS Code –2525)

(i) Top 3 Sources of Mica, Mica Waste to China in 2022 by percentage:



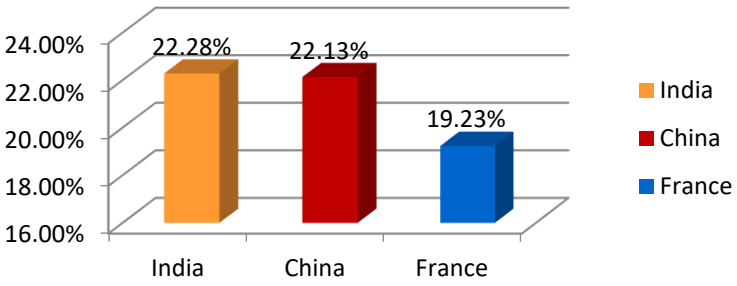
More than 58.69% of Mica, Mica Waste imports of China comes from India in 2022 followed by Madagascar (18.81%) and Nigeria (10.47%). (Source : UN Comtrade)

(ii) Top 3 Sources of Mica, Mica Waste to Japan in 2022 by percentage**:**



Japan imported 72.91 % of Mica, Mica Waste from China in 2022. India stood at 2nd major sources of it to Japan with 16.09% share followed by Canada with 4.03%. (Source : UN Comtrade).

(iii) Top 3 Sources of Mica, Mica Waste to Germany in 2022 by percentage**:**



Germany imports 22.28% share of Mica, Mica Waste from India in 2022. China and France were 2nd and 3rd major source countries of the Mica, Mica Waste to Japan with 22.13% and 19.23% share respectively in that year.**(Source : UN Comtrade)**

IMPORT

Amino & Phenolic Resins and Polyurethanes in Primary Forms

Amino Resins or Urea-formaldehyde (**UF**) so named for its common synthesis pathway and overall structure, is a no transparent thermosetting resin or polymer. It is produced from urea and formaldehyde. These resins are used in adhesives, plywood, particle board, medium-density fibreboard (MDF), and moulded objects. In agriculture, urea-formaldehyde compounds are one of the most commonly used types of slow-release fertilizer.

Amino resin's attributes include high tensile strength, flexural modulus, high heat-distortion temperature, low water absorption, mould shrinkage, high surface hardness, elongation at break, and volume resistance.

Amino Resins is pervasive. Examples include decorative laminates, textiles, paper, foundry sand moulds, wrinkle-resistant fabrics, cotton blends, rayon, corduroy, etc. It is also used as wood glue. UF was commonly used when producing electrical appliances casing. Foams have been used as artificial snow in movies. Urea-formaldehyde compounds are a widely used as slow-release sources of nitrogen in agriculture. The rate of decomposition into CO_2 and NH3 depends on the length of the urea-formaldehyde chains and it relies on the action of microbes found naturally in most soils.

UF and related amino resins are a class of thermosetting resins of which urea-formaldehyde resins make up 80% produced worldwide. Examples of amino resins use include in automobile tires to improve the bonding of rubber, in paper for improving tear strength, and in moulding electrical devices, jar caps, etc.

P**henolic resins** are synthetic polymers obtained by the reaction of phenol or substituted phenol with formaldehyde. Used as the basis for Bakelite, PFs were the first commercial synthetic resins (plastics). They have been widely used for the production of moulded products including billiard balls, laboratory countertops, and as coatings and adhesives. They were at one time the primary material used for the production of circuit boards but have been largely replaced with epoxy resins and fiberglass cloth, as with fire-resistant FR-4 circuit board materials.

Phenolic resins are found in myriad industrial products. Phenolic laminates are made by impregnating one or more layers of a base material such as paper, fiberglass, or cotton with phenolic resin and laminating the resin-saturated base material under heat and pressure. The resin fully polymerizes (cures) during this process forming the thermoset polymer matrix. The base material choice depends on the intended application of the finished product. Paper phenolic are used in manufacturing electrical components such as punch-through boards, in household laminates, and in paper composite panels. Glass phenolic are particularly well suited for use in the high speed bearing market. Phenolic micro-balloons are used for density control. The binding agent in normal (organic) brake pads, brake shoes, and clutch discs are phenolic resin.

Polyurethane often abbreviated **PUR** and **PU**) refers to a class of polymers composed of organic units joined by carbamate (urethane) links. In contrast to other common polymers such as polyethylene and polystyrene, polyurethane is produced from a wide range of starting materials. This chemical variety produces polyurethanes with different chemical structures leading to many different applications. These include rigid and flexible foams, and coatings, adhesives, electrical potting compounds, and fibres such as spandex and polyurethane laminate (PUL).

A polyurethane is typically produced by reacting an isocyanate with a polyol. Since a polyurethane contains two types of monomers, which polymerize one after the other, they are classed as alternating copolymers. Both the isocyanates and polyols used to make a polyurethane contain two or more functional groups per molecule.

Polyurethanes are commonly used in a number of medical applications, including catheter and general purpose tubing, hospital bedding, surgical drapes, wound dressings and a variety of injection-molded devices. Their most common use is in short-term implants.

These are broadly classified under **H. S. Code - 3909**

Table - 7

India's Top 10 Sources of Amino & Phenolic Resins and Polyurethanes(H. S. Code- 3909)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	142.74	24.59	144.59	30.30	290.80	35.77	329.91	35.04
2.	Korea RP	88.80	15.30	52.69	11.04	113.52	13.97	134.73	14.31
3.	Singapore	76.55	13.19	52.51	11.00	90.16	11.09	76.15	8.09
4.	Netherland	63.14	10.88	39.41	8.26	47.37	5.83	71.61	7.60
5.	Japan	31.10	5.36	29.27	6.13	51.91	6.39	64.66	6.87
6.	Saudi Arab	17.55	3.02	14.77	3.10	27.74	3.41	60.18	6.39
7.	Germany	33.94	5.85	21.75	4.56	31.33	3.85	48.26	5.12
8.	Belgium	17.62	3.04	27.29	5.72	34.26	4.21	31.81	3.38
9.	Italy	25.91	4.46	23.12	4.84	27.51	3.38	26.33	2.80
10.	Taiwan	14.02	2.42	11.61	2.43	18.78	2.31	18.89	2.01
	Others	69.03	11.89	60.14	12.60	79.48	9.78	79.11	8.40
	Total	580.40	100	477.16	100	812.85	100	941.64	100

Source: DGCI&S

Note : India's Import including re-import

In value terms, India ((US $ 941.64 M) constitutes one of the largest market for imported Amino & Phenolic resins and polyurethanes (in primary forms) in the world in 2022. It was increased by 15.84% from the year 2021. In 2022 China(US $ 329.91 M) was the key supplier of Amino & Phenolic resins and polyurethanes (in primary forms) to India, making up making up 35.04% of total imports of India in 2022 . Korea RP (US $ 134.73 M) took the second source country in the ranking with 14.31% share of total import of Amino & Phenolic resins and polyurethanes (in primary forms) to India. Which was distantly followed by Singapore (US $ 76.15 M), whose share was 8.09% if India's total. All these three countries together took approx. 57.44% share of total imports to India in 2022.

Table – 8

World Top 10 Importer of Amino & Phenolic Resins and Polyurethanes(H. S. Code- 3909)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	USA	772.41	4.91	684.00	4.66	1485.71	6.71	1884.35	8.63
2.	China	1562.60	9.93	1587.15	10.81	2033.36	9.18	1863.08	8.54
3.	Germany	1095.79	6.97	977.41	6.65	1497.34	6.76	1560.36	7.15
4.	Netherlands	594.44	3.78	543.75	3.70	884.86	3.99	1084.64	4.97
5.	Italy	666.79	4.24	599.21	4.08	1003.65	4.53	1032.86	4.73
6.	France	673.63	4.28	566.68	3.86	919.78	4.15	969.85	4.44
7.	**India**	**579.85**	**3.69**	**477.70**	**3.25**	**813.04**	**3.67**	**939.64**	**4.31**
8.	Canada	627.47	3.99	545.16	3.71	768.29	3.47	933.67	4.28
9.	Poland	273.00	1.74	530.33	3.61	909.45	4.10	867.26	3.97
10.	Türkiye	431.57	2.74	442.07	3.01	730.36	3.30	787.20	3.61
	Others	8451.05	53.73	7735.35	52.66	11110.74	50.15	9900.50	45.37
	Total	15728.59	100	14688.82	100	22156.58	100	21823.42	100

Source :UNComtrade

According to the United Nation's COMTRADE database, global imports of Amino & Phenolic resins and polyurethanes (in primary forms) stood at amounting to US $ 21.82 Billion in 2022. In that year the global import of it has briefly decreased by 1.50% from the previous year's import. USA was the world's top importer of Amino & Phenolic resins and polyurethanes (in primary forms) with total value of US $1.88 Billion in 2022, which represented 8.63% of global import of Amino & Phenolic resins and polyurethanes (in primary forms). China(US $ 1.86 B) and Germany(US $ 1.56 B) constitutes the 2nd and 3rd largest importer of it with 8.54% and 7.15% share of global import. **India**, in contrast, imported a comparable US $ 939.64 million of Amino & Phenolic resins and polyurethanes (in primary forms) in 2022, ranked in 6th position in the world with 4.31% share of world import value of Amino & Phenolic resins and polyurethanes (in primary forms) in 2022.

Copper Ores and its Concentrates

Copper (Cu) ore is a naturally occurring mineral deposit that contains copper in varying concentrations. It is an important industrial metal that has been used by human civilizations for thousands of years due to its excellent electrical and thermal conductivity, high ductility, and resistance to corrosion. Copper is widely used in various applications, including electrical wiring, plumbing, construction, transportation, and electronics, making it a critical component of modern society.

Copper ore is typically found in the Earth's crust in the form of copper minerals, such as chalcopyrite, bornite, malachite, and chalcocite, among others. The formation of copper ore deposits involves complex geological processes, including hydrothermal activity, magmatic intrusions, and weathering of rocks. Copper ore deposits are found in various types of geologic environments, including porphyry deposits, skarn deposits, sedimentary deposits, and volcanogenic massive sulfide deposits, among others.

Mining and extraction of copper ore involve various methods, such as open-pit mining, underground mining, and in-situ leaching, depending on the type and location of the deposit. After extraction, copper ore is processed and beneficiated to obtain copper concentrates, which are then further refined to produce high-quality copper products.

The global distribution of copper ore deposits is widespread, with major producing countries including Chile, Peru, China, the United States, and Australia, among others. Copper mining and processing have significant economic importance, contributing to global trade, employment, and economic development. However, copper mining also has environmental and social impacts, including land degradation, water and air pollution, biodiversity loss, and social and cultural impacts on local communities.

The Old Copper Complex in North America has been radiometrically dated to 9500 BP—i.e., about 7480 BCE—making it one of the oldest known examples of copper extraction in the world. The earliest evidence of the cold-hammering of native copper comes from the excavation at Çayönü Tepesi in eastern Anatolia, which dates between 7200 to 6600 BCE. Among the various items considered to be votive or amulets, there was one that looked like a fishhook and one like an awl. Another find, at Shanidar Cave in Mergasur, Iraq, contained copper beads, and dates back to 8,700 BCE.

Copper concentrates produced by mines are sold to smelters and refiners who treat the ore and refine the copper and charge for this service via treatment charges (TCs) and refining charges (RCs). The TCs are charged in US$ per tonne of concentrate treated and RCs are charged in cents per pound treated, denominated in US dollars, with benchmark prices set annually by major Japanese smelters. The customer in this case can be a smelter, who on-sells blister copper ingots to a refiner, or a smelter-refiner which is vertically integrated.
One prevalent form of copper concentrate contains gold and silver, like the one produced by Bougainville Copper Limited from the Panguna mine from the early 1970s to the late 1980s.

The typical contract for a miner is denominated against the London Metal Exchange price, minus the TC-RCs and any applicable penalties or credits. Penalties may be assessed against copper concentrates according to the level of deleterious elements such as arsenic, bismuth, lead or tungsten. Because a large portion of copper sulfide ore bodies contain silver or gold in appreciable amounts, a credit can be paid to the miner for these metals if their concentration *within the concentrate* is above a certain amount. Usually the refiner or smelter charges the miner a fee based on the concentration; a typical contract will specify that a credit is due for every ounce of the metal in the concentrate above a certain concentration; below that, if it is recovered, the smelter will keep the metal and sell it to defray costs.

Copper concentrate is traded either via spot contracts or under long term contracts as an intermediate product in its own right. Often the smelter sells the copper metal itself on behalf of the miner. The miner is paid the price at the time that the smelter-refiner makes the sale, not at the price on the date of delivery of the concentrate. Under a Quotational Pricing system, the price is agreed to be at a fixed date in the future, typically 90 days from time of delivery to the smelter.

These are broadly classified under **H. S. Code - 2603**

Table - 9

India's Top 10 Sources of Copper Ore and its Concentrates (HS Code :2603)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Chile	741.03	62.36	545.45	60.69	802.83	31.90	927.66	28.40
2.	Indonesia	68.20	5.74	225.53	25.09	501.18	19.92	927.63	28.39
3.	Australia	92.65	7.80	17.40	1.94	502.74	19.98	423.12	12.95
4.	Peru	118.94	10.01	34.63	3.85	301.73	11.99	318.68	9.75
5.	Panama	32.87	2.77	0.00	0.00	160.80	6.39	218.12	6.68
6.	Papua N GNA	0.00	0.00	0.00	0.00	0.00	0.00	133.72	4.09
7.	Brazil	0.00	0.00	0.00	0.00	33.74	1.34	102.43	3.14
8.	Canada	37.12	3.12	39.25	4.37	39.37	1.56	81.06	2.48
9.	Malaysia	0.00	0.00	22.93	2.55	30.59	1.22	68.92	2.11
10.	Taiwan	0.00	0.00	0.00	0.00	0.00	0.00	65.56	2.01
	Others	97.44	8.20	13.62	1.52	143.48	5.70	0.02	0.00
	Total	1188.26	100	898.82	100	2516.47	100	3266.91	100.00

Source: DGCI&S

Note : India's Import including Re-import

In 2022, most of the Copper Ores and its Concentrates imported to India originated from Chile with an import value of US $ 927.66 million, comprises with 28.40% share of India's total import of Copper Ores and its concentrates. In 2022 the import of Copper Ores and its Concentrates increased by 29.82% compare to the year 2021. On the other hand, other countries such as Indonesia and Australia were becoming 2nd and 3rd largest source countries of Copper Ores and its Concentrates for India with 28.39% and 12.95% share of India's total import respectively in 2022. In that year Indonesia and Australia sold US $ 927.63 Million and US $ 423.12 Million of Copper Ores and its Concentrates to India respectively.

Table - 10

World Top 10 Importer of Copper Ore and its Concentrates (HS Code :2603)

Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	33908.94	56.65	36472.87	56.51	56805.66	59.47	56328.47	57.84
2.	Japan	8192.96	13.69	9798.05	15.18	13039.95	13.65	13718.13	14.09
3.	Rep. of Korea	3447.48	5.76	4249.95	6.58	6017.23	6.30	6578.33	6.75
4.	**India**	**1187.74**	**1.98**	**897.66**	**1.39**	**2523.91**	**2.64**	**3268.21**	**3.36**
5.	Germany	1919.80	3.21	2421.81	3.75	3052.50	3.20	2653.39	2.72
6.	Spain	2330.91	3.89	1833.16	2.84	2710.97	2.84	2212.17	2.27
7.	Bulgaria	1396.67	2.33	1670.67	2.59	2033.79	2.13	2186.30	2.24
8.	Other Asia nes	871.26	1.46	797.21	1.24	1586.66	1.66	1323.37	1.36
9.	Philippines	33.07	0.06	88.66	0.14	152.20	0.16	1241.54	1.27
10.	Finland	688.64	1.15	910.51	1.41	1292.37	1.35	1151.70	1.18
	Others	5876.70	9.82	5399.74	8.37	6303.35	6.60	6729.89	6.91
	Total	59854.18	100	64540.30	100	95518.59	100	97391.50	100

Source :UNComtrade

The China imported around US $ 56.33 billion worth of Copper Ores and its Concentrates in 2022, making it the leading importer of Copper Ores and its Concentrates worldwide comprising with 57.84% share of world total that year. Japan followed in second place, importing around US $ 13.72 billion worth of the Copper Ores and its Concentrates or 14.09% share and Rep. Korea in 3rd place importing around US $ 6.58 billion or accounted 6.75% share of world total import. The import value of Copper Ores and its Concentrates into **India** amounted to US $ 3.27 Billion in the year 2022 and ranked in 4th position in the world with the share of 3.36% of total Global import value of Copper Ores and its Concentrates. In the year 2022 the global import value of Copper Ores and its Concentrates was US $ 97.39 Billion which was gain by almost 2% from the previous year.