Indian Minerals Yearbook 2017

(Part- III : Mineral Reviews)

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MINOR MINERALS

30.3 CALCITE

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
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30-3 Calcite

Calcite is a rock forming mineral with a chemical formula of ($CaCO_3$), containing 56% CaO and 44% CO_2. It is exremely common and found throughout the world in igneous, sedimentary and metamorphic rocks. It is one of the important industrial minerals also known as 'Calc Spar'. Pure crystallised transparent variety of calcite known as 'Iceland Spar' is used for optical purposes.

RESERVES/RESOURCES

Calcite occurs in abundance in India. As per NMI data, based on UNFC system as on 01.04.2015, the total reserves/resources of calcite have been estimated at about 23 million tonnes of which about 3.45 million tonnes (15%) are under 'reserves' category and remaining are under 'resources' category. Of the total resources, Chemical grade accounts for 22% and glass & ceramic grade about 3%. The remaining 75% resources fall under Unclassified/Not-known and Other grades etc.

Rajasthan has the largest share (53%) of calcite resources, followed by Andhra Pradesh (40%) and Madhya Pradesh (5%). The remaining resources (2%) are located in Karnataka, Gujarat, Haryana, Tamil Nadu and Uttar Pradesh (Table- 1).

EXPLORATION & DEVELOPMENT

The exploration & development details, if any, are given in the review on "Exploration & Development" in "General Reveiws".

PRODUCTION

As per GOI Notification S.O. 423(E), dated 10th February, 2015, 'calcite' has been declared as 'Minor Mineral' hence,the production data is not available with IBM.

MINING AND MARKETING

Almost all calcite mines in the country are worked manually by opencast methods and most of these are confined to shallow depths except the semi-mechanised Belkapahar Wollastonite and Calcite Mine of Wolkem Industries Ltd in Sirohi district, Rajasthan. Mining of calcite possess certain difficulties in excavating of transparent crystals as application of pressure during mining which affects the transparency causes internal imperfections and cracks. Therefore, precaution and care during mining is imperative so that final marketable products can be produced with maximum recovery. Calcite is usually marketed after pulverising or after some initial processing and grinding to a fine powder size ranging from 200 to 300 mesh. In Rajasthan, Wolkem India Ltd, the principal Mining Company, markets its products under three different trade names, viz, Calstar 1-4 (Super snow-white powder with 100% whiteness), Calsun 1-5 (snow white powder with 98.4% whiteness) and Belsun 1-4 (white powder with 95% whiteness). Besides, super snow-white micronised products (Calcron and Addon) of extremely high brightness and whiteness (25 to 5 microns) and ultra fine slurries and powder (FMT) with top size of 2 microns are also marketed by the Company. Naga Ltd, South India's largest producer of white minerals having a captive mine producing calcite powder. The capacity of calcite powder is 50,000 tonnes per annum.

USES AND SPECIFICATIONS

The use of calcite is dictated by its level of purity. The highest purity of $CaCO_3$, which is as high as (+) 98%, has minimum inclusions and highest brightness. Its applications are in

Table – 1 : Reserves/Resources of Calcite as on 1.4.2015
(By Grades/States)

(In tonnes)

Grade/ State	Reserves				Remaining Resources								Total Resources (A+B)
	Proved STD111	Probable		Total (A)	Fea1ility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
		STD121	STD122			STD221	STD222						
All India : Total	**928119**	**798170**	**1722578**	**3448867**	**1332076**	**217790**	**3339239**	**9122696**	**1246494**	**4204311**	**97476**	**19555082**	**23003949**
By Grades													
Chemical	449149	-	19581	468730	753222	170359	1881020	-	-	1750993	-	4555594	5024324
Glass & Ceramic	-	8098	5175	13273	92767	47423	90993	20250	67395	451704	-	770532	783805
Poor/Low	-	-	-	-	-	-	-	-	70310	134220	-	204530	204530
Others	313094	-	963270	1276364	27656	8	827193	500	-	22813	-	878170	2154534
Unclassified	165876	790072	734552	1690500	236446	-	247670	8557000	66551	1391088	-	10493756	12184256
Not-known	-	-	-	-	221985	-	292363	544946	1042238	453493	97476	2652501	2652501
By States													
Andhra Pradesh	16522	8098	119526	144146	8538	-	105470	8562700	5200	282204	-	8964112	9108258
Gujarat	-	-	-	-	-	-	-	-	-	12380	-	12380	12380
Haryana	-	-	-	-	166900	-	183900	-	-	-	-	350800	350800
Karnataka	-	-	-	-	31800	-	15900	-	14400	51547	-	113647	113647
Madhya Pradesh	-	-	5175	5175	215327	35077	160421	20250	180226	358636	97476	1067412	1072587
Rajasthan	911597	790072	1597877	3299546	909511	182713	2873548	539746	1041668	3371912	-	8919099	12218645
Tamil Nadu	-	-	-	-	-	-	-	-	-	116632	-	116632	116632
Uttar Pradesh	-	-	-	-	-	-	-	-	-	11000	-	11000	11000

Figures rounded off.

varying sizes from coarse to as fine as 10 to 2 microns. Various grades of calcite products marketed by Wolkem India Ltd contain $CaCO_3$ 95-98.5%, MgO 0.2-0.4%, SiO_2 0.3% and Fe_2O_3 0.03-0.15%.

Calcite is one of the important ingredients required in Glass and Ceramic Industries for imparting glaze and it is also used as a flux. In pulverised form, it is used as a filler in rubber goods, textile and as an extender in paints and as a carrier in insecticides. Other uses are in the manufacture of mortar, cement, bleaching powder, abrasive, for agricultural soil treatment and enpharmaceuticals etc. It is also used in the preparation of fat lime, soaps, detergents, plastics, polymers, etc. The $CaCO_3$ content in calcite used in Glass Industry is 95% (min.) and in Ceramic Industry 95%. Calcium oxide is a mild flux and makes the glass stick to the articles shaped by its hardening nature. Generally, 54% (min.) CaO is used. In Ceramic Industry, generally, super-white calcite of 30 mesh is used while in Glass Industry, powder size ranging from 20 to 80 mesh is used.

Global market of calcite is projected to reach 98.7 million by 2020. Calcite as GCC finds extensive use as a filler in plastics, paper, rubber and paint industry. According to Global Induatry Analysis, strong consumption in paper and plastic production may drive the calcite martket upwards. In paper industry, calcite is used as filler to produce high quality, waterproof anti-smudge papers and in plastics it is used as an additive to improve surface opacity, gloss and impact strength.

The transparent crystal of calcite (Iceland Spar) free from flaw is most valued in the Optical Industry for the manufacture of Nicol prism. However, polarised films and lenses are fast replacing Nicol prisms. 'Iceland Spar' used in optical instruments, like polarising microscopes, should have a high degree of purity and perfect crystalline structure. The mineral must be at least 2.54 cm long and 1.27 cm thick (2-inch cube is preferred), colourless, perfectly transparent and free from cloudy inclusions, cavities or foreign substances. It should be free from internal iridescence caused due to incipient cracks along cleavage planes and from twinning other than parallel to the base.

BIS has prescribed IS : 15751-2007 (reaffirmed in March-2012) as specification for use of calcite in Ceramic Industry.