

BENEFICIATION OF LOW GRADE WOLFRAMITE ORE
FROM DEGANA, RAJASTHAN (*)

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Wolframite is one of the principal minerals containing tungsten and is considered as a strategic mineral because of its importance and short supply. It is a tungstate of iron and manganese. Low grade wolframite deposits occur in India at Agargaon, Nagpur; Kalimati, Singhbhum; Chenndapathar, Bankura; Jhirpalla, Ahmedabad; Kadavur and Ururakanad, Tiruchinapalli and on Rawat hill, near Degana, Jodhpur.

The work reported in this paper was carried-out with eluvial ore (paydirt) from Rawat hill, near Degana, Jodhpur, Rajasthan. It is reported that eluvial ore in that area occurs upto a depth of 5 to 30 ft. The average mineralogical composition of the ore has been reported to be Quartz -32%; feldspar -44.7%; Calcareous matter -15.0%; opaques (magnetite, wolframite etc.) -0.7%; Mica -2.5%; others (topaz, zircon, monazite, gauat etc.) -5.1%. The assay of the ore has been reported to be always less than 0.05% WO_3 . The wolframite occurs in prismatic and tabular crystals with hardness of about 5 and a specific gravity of 7.17. It is black in colour and had a good cleavage and is brittle. It is fairly magnetic. It chemically analyses: WO_3 -64.8%; Feo-15.8%, MnO -9.7%.

Wolframite concentrates are produced in that area by mannual dry panning of eluvial gravel and the assay is about 65% WO_3 . The recovery is said to be very low.

Since wolframite is very heavy (sp.gr. 7.17) and the bulk of the gangue being quartz, felspar, calcareous matter and mica (constituting 94.2% of ore) concentration methods based on gravity difference were tried. The results are summarised in the accompanying table. For the pneumatic preconcentration and jigging and tabling of classified feed a new device

(*) Paper for presentation at the Symposium on "Recent Developments in Non-Ferrous Metals Technology"- 4th to 7th December, 1968, Jamshedpur.

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designed and fabricated in the laboratory was made use of to discard as much gangue as possible in a dry operation. The new device, called pneumatic pre-concentrator, consisted of a rectangular frame with a hopper and electrically vibrated feeder at the upper deck and a powerful fan (axial flow type) on the lower deck. Horizontal vanes were fitted in front of the fan to make the air flow in a streamlined fashion. The feed was allowed to fall vertically into horizontal wind current which flew away lighter and finer materials. The collection of products was done in a rectangular trough placed in the direction of wind and cuts were made after examining the spread of falling material.

TABLE:

Principal methods of operation. Concentrate

<u>Expt. No.</u>	<u>Wet/Dry.</u>	<u>Processes adopted.</u>	<u>Grade WO₃%</u>	<u>Recovery %</u>
<u>WO</u> <u>14</u>	Wet	Wet tabling	10.4	35.07
<u>WO</u> <u>15</u>	Wet & Dry.	Wet tabling Mag. Separation High tension separation.	26.6	27.54
<u>WO</u> <u>16</u>	Wet & Dry.	Jigging, wet tabling, Mag- netic separa- tion High ten- sion separation.	26.6	58.05
<u>WO</u> <u>17</u>	Dry	Pneumatic tabling.	17.62	28.5
<u>WO</u> <u>18</u>	Wet & Dry	Jigging, wet tabling, Magnetic separation.	44.37	44.76
<u>WO</u> <u>20</u>	Dry & Wet	Pneumatic pre-conc. jigging, wet tabling, Mag. separation and High tension separation.	53.88	61.4

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