TR 10_135_137

R. 514

MT. REX—TIN CONCENTRATION TEST.

Introduction

Following an inspection of the property being investigated by Messrs. Brinkman and Dicker, the Chief Chemist and Metallurgist requested that they submit a sample from the Tin Lode in the open cut for a preliminary metallurgical study aimed at tin extraction.

The sample submitted assayed:—

Tin	Sn	4.8 per cent
Tungsten	WO_3	Trace
Copper	Cu	0.26 per cent
Lead	Pb	0.15 „ „
Zinc	Zn	0.92 „ „
Sulphur	S	14.2 „ „

Procedure

The sample was reduced to pass an 8 mesh screen in the jaw crusher, then wet screened on 22 and 60 mesh screens. The plus 22 and plus 60 products were jigged and the minus 60 product tabled to produce the primary concentrates.

The plus 22 jig tailing was stage ground in the laboratory ball mill to pass a 22 mesh screen then screened on 60 mesh. The minus 60 material was combined with the plus 60 jig tailing which had also been reduced by stage ball milling to pass a 60 mesh screen. This minus 60 mesh material was tabled to yield a secondary tin concentrate.

The jigging of the plus 60 product made from the grinding of the plus 22 jig tailing did not make a satisfactory separation so the whole was stage ground to pass a 60 mesh screen, then tabled to yield the tertiary tin concentrate.

In tabling the concentrates contained the cassiterite and other heavy minerals (e.g. the sulphides).

The two jig concentrates were examined using acetylene tetrabromide (S.G. 2.954) to see how the tin occurred in them.

Results

The test shows that on initial crushing and sizing, 73 per cent of the tin is recoverable in concentrates. By carrying out one stage of regrinding, 10 per cent more of the tin is recovered in concentrates. A further stage of regrinding recovered a further 6 per cent more of the tin making in all a recovery of 89 per cent.

However, the grade of the two primary jig concentrates is low. Investigating these using heavy solution showed that:—

Product	Per Cent Tin	Per Cent Tin Dist. Overall
22 mesh jig conc. sink at 2.954	28	23.2
22 mesh jig conc. float at 2.954	1.1	1.5
22 mesh jig conc.	10.8	24.7
60 mesh jig conc. sink at 2.954	40	19.0
60 mesh jig conc. float at 2.954	1.2	1.4
60 mesh jig conc.	12.6	20.4

Comments

While the apparent recovery is quite high, the head value for the sample is high too and a high recovery is to be expected.

No attempt has been made to remove sulphide minerals, hence the concentrate grades are low on this account.

Examination of the heavy solution products reveals that the jig concentrates contain considerable composites of cassiterite with other minerals, principally quartz, hence to obtain a high grade tin concentrate some further grinding is necessary and with it some reduction in overall recovery of tin.

The final tailing is all minus 60 mesh which at this stage of the property development is considered sufficiently fine. Finer grinding would doubtless release more recoverable tin.

Conclusion

This test shows that jigging and tabling should be applicable to the concentration of this ore. The jigging of say, a minus 16, plus 44 mesh fraction may yield better results and flotation of the sulphides ahead of tabling should improve table concentrate grade.

Summary (includes regrinding of tailings until all pass 60 mesh screen)

Product	Per Cent		Per Cent Tin Distribution
	Weight	Tin	
Primary Conc.			
+22 mesh jig	10.90	10.8	24.7
+60 mesh jig	7.26	13.4	20.4
−60 mesh table	3.77	35.9	28.3
Total	21.93	16.0	73.4
Secondary Conc.			
−60 mesh table	2.14	26.7	10.1
Tertiary Conc.			
−60 mesh table	1.67	21.5	6.3

Tailings			
—60 mesh Primary	19.88	0.77	3.2
—60 mesh Secondary	29.45	0.56	2.9
—60 mesh Tertiary	24.93	0.96	4.1
Total	74.26	0.74	10.2
Head	100.0	4.98	100.0

Tailings from Primary Concentration before any Regrinding

Product	Per Cent		Per Cent Tin Distribution
	Weight	Tin	
Tailings			
+22 Jig	45.62	2.07	19.8
+60 Jig	12.57	1.37	3.6
—60 Table	19.88	0.77	3.2
Total	78.07	1.62	26.6
Head	100.0	4.77	100.0