

Complex Orebodies Conference 2018

Paper Number 8

Processing carbonate hosted zinc – lead ores

R W SHAW¹

1. Director, Minetometal Pty Ltd, Carlton North Melbourne Victoria 3054, FAusIMM

ABSTRACT

There are many small to medium complex zinc containing deposits where the zinc is not economically recoverable either as concentrate or metal. The carbonate hosted zinc-lead ores common in areas such as the Zamanti region of Turkey are one prime example.

The lead can be recovered into high grade marketable concentrates using gravity and flotation. The oxidised zinc minerals such as smithsonite (zinc carbonate) and/or hemimorphite (hydrated zinc silicate) are not amenable to gravity or flotation giving poor recovery and modest grades. One very attractive option is to use a combined lead flotation zinc leach process to produce lead concentrate and high purity, high surface area zinc oxide suitable for direct sale for rubber vulcanisation and other applications.

The carbonate present precludes the use of conventional sulphuric acid leaching and necessitated the development of an ammonia – ammonium chloride leach to selectively extract zinc from the tailings of the lead flotation step. The zinc leach liquor is purified and the zinc precipitated and converted to high surface area high purity zinc oxide. The paper also provides an economic analysis which highlights the advantages gained through minimising transportation, and through not requiring the high CAPEX /OPEX electrowinning step. The process benefits from the zinc oxide product having a significant price premium.

The process is economic at relatively small scale which is particularly suited to the carbonate hosted deposits which tend to be localised and not as large as many of the sulphide deposits. The leach process can also be adapted to treat other zinc containing feed materials and the paper will include a discussion of options for treating those. The process has been developed at laboratory and small pilot scale and is ready for commercialisation.