

Book news

1. Mintek reports

The following reports are available free of charge from the Council for Mineral Technology, Private Bag X3015, Randburg, 2125 South Africa.

● Report M133

Binding mechanisms in chromite briquettes at low and high temperatures.

A high percentage of South African chromium ore occurs as fines. One way in which these fines can be utilized in an arc furnace, which is currently the most widely used type of furnace for the reduction of chromium ore, is as briquettes.

The briquettes should have reasonable green strength to facilitate handling and, after being cured, they should be strong enough to be fed to the furnace. Cohesion should also be maintained up to high temperatures, preferably close to the sintering temperature of chromite under reducing conditions, i.e. 1200 to 1300°C for South African chromite.

With this in mind, a series of briquettes made with different binding media were subjected to mineralogical examination so that the reactions that take place in the binding media and the temperatures at which they take place could be established. In this report, the results are discussed and correlated with the strength of the briquettes in each case.

The assumptions on which the calculations for the binding materials were based are detailed in an appendix.

● Report M141

The development of a modified milling technique for the treatment of andalusite-bearing shales.

Various modifications in attrition-milling techniques were tested by the Council for Mineral Technology (Mintek) in attempts to improve the recovery of andalusite from shales that do not respond readily to the standard milling procedure.

Autogenous milling, in a mill that allowed the liberated andalusite crystals to pass directly through the equally spaced bars making up the body of the mill, was found to be the most effective, the improvement in the amount of andalusite recovered being up to 80 per cent. However, the mill design was considered to be unpractical and likely to present mechanical difficulties in scale-up.

A modified standard overflow type of rod mill, which operated with a greatly reduced rod load (for milder impact), and from which liberated material was removed by mechanical scoops built into the mill, also gave improved results on hard shales that had been considered untreatable. Hence, mild impact and the rapid removal of liberated andalusite were recognized as being the most important requirements for improved yield.

A standard attrition mill was then modified to conform to

these requirements by the placing of grate-discharge openings in the mill shell, the use of hollow steel tubes to provide mild impact, and the use of high flowrates of water to ensure rapid removal of the liberated material.

Prescreening of the ore was also found to increase the yield of andalusite by recovering the andalusite that had been liberated in the mining and crushing stages, and was incorporated in the milling procedure.

Tests were done on numerous ores using the pre-screening-modified milling technique, and the results showed an improvement of up to 60 per cent in the amount of andalusite recovered over that recovered by the standard procedures.

A pilot plant incorporating prescreening and the modified mill was run in parallel with a standard operating plant so that the new technique could be compared with standard mine practice. In all instances, the Mintek mill gave higher yields of andalusite (over 40 per cent higher than the mine plant) with no detrimental effect on the quality or the particle-size distribution of the andalusite produced.

The technique is shown to be versatile and flexible, since the Mintek mill can treat hard shales as well as soft, friable shales, requiring only adjustment of the rod load to suit the nature of the ore.

● Report M153

The determination, by ion chromatography, of chlorine, bromine, phosphorus, and sulphur in organic materials.

Chlorine, bromine, phosphorus, and sulphur are determined in organic materials after combustion in an oxygen flask. The combustion gases are collected in a suitable absorption solution, which is then analysed by ion chromatography. The precision of the method is good, as indicated by the relative standard deviation, which was found to be 0,014 for sulphur, 0,022 for chlorine, and 0,018 for bromine. The precision of the method for phosphorus was not determined.

2. Canadian publications

● The following reviews of the activity and developments during 1982 in respect of the chief minerals produced or consumed in Canada are now available. Prepared by members of the Mineral Policy Sector staff, they are for sale at \$1.25 per copy. Requests for copies should be addressed to Canadian Government Publishing Center, Supply and Services Canada, Ottawa, Canada K1A 0S9, accompanied by postal money order payable to the Receiver General for Canada.

Clays and Clay Products, by M. Prud'homme. 11 pp.

Cobalt, by D.G. Fong. 5 pp.

Columbium (Niobium) and Tantalum, by D.G. Fong. 5 pp.

Indium, by J. Bigauskas. 2 pp.

Mineral Aggregates, by D.H. Stonehouse.

Stone, by M. Prud'homme. 13 pp.