

6.5 Scheelite Extraction

The use of Quebracho in the cleaning stages was not very effective in rejecting the scheelite in a low weight middling fraction as 46% of the scheelite still reported in the final concentrate for Test 9 when using Quebracho compared to an estimated 57% when it was omitted (Test 8).

6.6 Collector AP845

It is obvious from the results of Test 7 that excessive collector was used in this test. Further testing with AP845 will need to be carried out using a more appropriate addition along with Quebracho depressant for calcite.

6.7 Prospects for Chemical Treatment

Clearly, magnetic separation was not a satisfactory means of removing iron (i.e., magnetite) from the concentrate. The residual iron content of the non-magnetic fraction exceeded 5% Fe, and the magnetic fraction contained 20 to 30% of the total fluorite.

On the other hand, a series of cleaner flotation steps, with intermediate regrinding to improve liberation, progressively lowered the iron content with only a gradual decline in fluorite recovery. From Fig. 1, the best fluorite concentrate for subsequent chemical treatment might be prepared by the use of three cleaning stages, since the improvement in CaF_2 grade tails off beyond this. At this point, the concentrate contained 80% of the fluorite, at a grade of 82% CaF_2 , and a residual iron content of 2.9% Fe (97.3% of iron eliminated in tailings). Some improvement in the CaF_2 grade may result from the recommended use of Quebracho in the primary and secondary grinding stages, by depressing more calcite.

This concentrate would be an attractive feed material for the proposed chemical treatment process, which utilizes an acidic reagent, because the principal acid-consuming gangue minerals, magnetite and calcite, are largely eliminated by flotation. Moreover, the five-fold increase in CaF_2 grade is, of course, of great significance in reducing the size of the roaster, a major capital cost item.

This fluorite concentrate feed to the chemical treatment process would contain only about 60% of the tungsten content of the ore at a grade of about 0.4% WO_3 . The tungsten would remain in the residue after the chemical extraction of fluoride, but at a grade of around 0.2% WO_3 , it is doubtful that this residue could be considered an economic source of tungsten. Furthermore, the prospects for economic recovery of tin are not encouraging,