The New Vanadium Hydrometallurgical Processes Yet To Be Commercialised

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# ABSTRACT

.Magnetic separation is the standard route to produce concentrates. Salt roasting to extract vanadium followed by water leaching has been the standard processing route for many years and this locks up the titanium in a glass phase. The cost of suitable sodium salts, availability of capital and increasing energy costs and energy availability are critical factors in determining the viability of aspiring vanadium producers. Alternatively smelting of concentrate to produce pig iron and titanium slag is also used where the vanadium can be recovered in a slag from the pig iron. In this paper, factors influencing the recovery of vanadium are reviewed and emerging processing trends explored particularly hydrometallurgical. The work done to produce titanium rich concentrates exploiting differences in magnetic susceptibility and new hydrometallurgical routes to produce separate vanadium, titanium and iron oxide products are discussed. The new understanding that the vanadium might be locked in the lattice spinel with iron but it can be effectively leached with high recoveries using catalytic chemistry. The growing demand for vanadium electrolyte in Redox Flow Batteries now adds another value added product which can assist vanadium project economics. The important aspects of the processing of titaniferous magnetites have been condensed from the literature, published works, company websites, our own testwork and personal communication covering a range of titaniferous magnetites. Reference is made to a number of historical projects and future projects covering traditional process flowsheets and new technology process flowsheets such as TIVAN where titanium pigment, iron oxide and vanadium pentoxide are recovered.