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LESSONS LEARNED FROM IONIC CLAY TESTWORK

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ABSTRACT

There exists a third class of rare earth (RE) ores, which are called ionic clays. They are typically found in southern China and other subtropical areas. They are formed by the chemical weathering of rare earth elements (REE)-containing parent rocks, resulting in the formation and mobilization of REE ions, which are then adsorbed onto the clay particles and hence, the class name.

The Caralue Prospect in South Australia was initially established as a high purity kaolin prospect following identification of thick intervals of bright white kaolin—close to surface—in several historical drill holes. A 2022 drilling program undertaken by iTech identified significant REEs, in the kaolin rich intervals, over a large area. The Caralue Bluff Prospect has an exploration target of 110-220 Mt @ 635-832 ppm TREO and 19-22% Al_2O_3. This exploration target is based on 80 drill holes, from a total program of 260 holes, across an area of approximately 12km x 12km, as reported by iTech on 18 August 2022, “Exploration Target Defined at Caralue Bluff”). Significantly, it remains open in multiple directions allowing for possible expansion. The REE mineralisation is rich in key magnet REEs namely neodymium, praseodymium, dysprosium and thulium (Nd-Pr-Dy-Tb) averaging 25% of the REE basket.

Initial testwork organised by Itech Minerals at a commercial laboratory achieved zero recovery. Itech contacted METS and a metallurgical testwork programmed was developed and executed resulting in eighty seven percent (87%) leaching recovery of the REEs. In addition, process optimisation resulted in a reduced OPEX and CAPEX. At the same time a kaolin product was produced as a by-product.

Keywords: Caralue Bluff Prospect, ionic clays, leaching, process optimisation, rare earth elements, total rare earth oxides (TREO).