

Ilmenite concentrate from a tin dressing plant of Roong - Aroon Takuapa Limited Partnership, Amphoe Takuapa, Phangnga Province, was selected for this research. The sample was a by-product from tin dressing plant containing 51.86 %  $\text{TiO}_2$ , 31.98 % Fe total, 22.74 % FeO, 20.44 %  $\text{Fe}_2\text{O}_3$  and 4.10 %  $\text{MnO}$ . The process to produce titanium oxide includes oxidation roast, reduction roast, aeration and chemical leaching.

Oxidation roast was done to oxidise ferrous iron to ferric iron. Suitable conditions for oxidation roast were at 1000 °C for 4 hours. Phases of the roasted product were pseudobrookite and rutile containing 51.86 %  $\text{TiO}_2$ , 31.98 % Fe total, 0.99 % FeO, 44.62 %  $\text{Fe}_2\text{O}_3$  and 4.10 %  $\text{MnO}$ .

Reduction roast was done by carbon monoxide gas produced by carbon roasting to reduce iron oxide in oxidised ilmenite to be metallic iron. Suitable conditions for reduction roast were at 1200 °C for 4 hours. Phases produced were pseudobrookite, anatase and metallic iron. It contained 23.73 % metallic iron and percentage of metallisation was 74.20.

Aeration stage was done by stirring of reduced ilmenite in ammonium chloride with aeration. Aeration of 30 gram reduced ilmenite in 2 % ammonium chloride with 40 % solids at 60 °C with 500 rpm stirrer speed and flow rate of 15 litres per minute for 12 hours were suitable conditions for aeration. Phases of the product were pseudobrookite and anatase having chemical compositions of 84.63 %  $\text{TiO}_2$ , 5.26 % Fe total, 3.34 % FeO, 3.80 %  $\text{Fe}_2\text{O}_3$  and 5.29 %  $\text{MnO}_2$ .

Leaching stage of the aerated sample was done using hydrochloric acid or sulphuric acid. Leaching had few effect on the sample. For hydrochloric acid leaching, the phases of the leached product were anatase and rutile having chemical composition of 87.61 %  $\text{TiO}_2$ , 3.49 %  $\text{Fe}_2\text{O}_3$  and 4.90 %  $\text{MnO}_2$  with 98.03 %  $\text{TiO}_2$  recovery. For sulphuric acid leaching, the leached product were anatase and rutile having chemical composition of 88.13 %  $\text{TiO}_2$ , 3.89 %  $\text{Fe}_2\text{O}_3$  and 5.07 %  $\text{MnO}_2$  with 94.16 %  $\text{TiO}_2$  recovery.