High grade rutile manufacturing method from ilmenite ore based on relatively low temperature oxidizing in air

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Titanium is a rare metal with some prominent properties such as high specific strength and corrosion resistance and biocompatibility. Although titanium is the 9th most abundant element in the earth's crust, its producing cost is quite high. Currently, metallic titanium is produced by chloridizing rutile (TiO_2), and reducing the obtained chloride (tetrachloride) with metallic magnesium (i.e., the Kroll process). In this study, we are focusing on cost reduction of rutile (TiO_2) manufacturing as raw material for titanium. There are many kinds of rutile extraction processes from ilmenite (FeTiO3) ore, but there are still some economical and environmental problems. Therefore, producing high purity rutile with low cost is very valuable for commercial use.

We discovered a new rutile manufacturing method, which facilitates the iron phase separation from ilmenite ore using only oxidizing. This provides a high-grade rutile for titanium production..

The new method of the rutile manufacturing initially follows an oxidation step of oxidizing a starting ilmenite. After the oxidation step, a reduction step is conducted to reduce the treated ilmenite, and after the reduction step, the iron component is dissolved with an acid, to thereby remove the iron component. As a result, we succeeded to obtain high purity rutile ($TiO_2 \geqq 97\%$) with the new method.

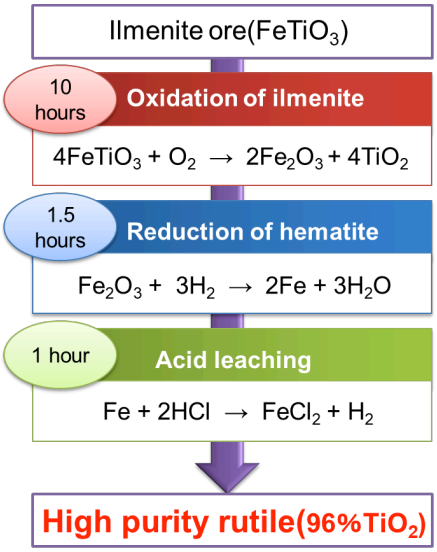

Figure 1. Rutile manufacturing process