

## Supplementary Material

# KOH-based hydrothermal synthesis of iron-rich titanate nanosheets assembled into 3D hierarchical architectures from natural ilmenite sands

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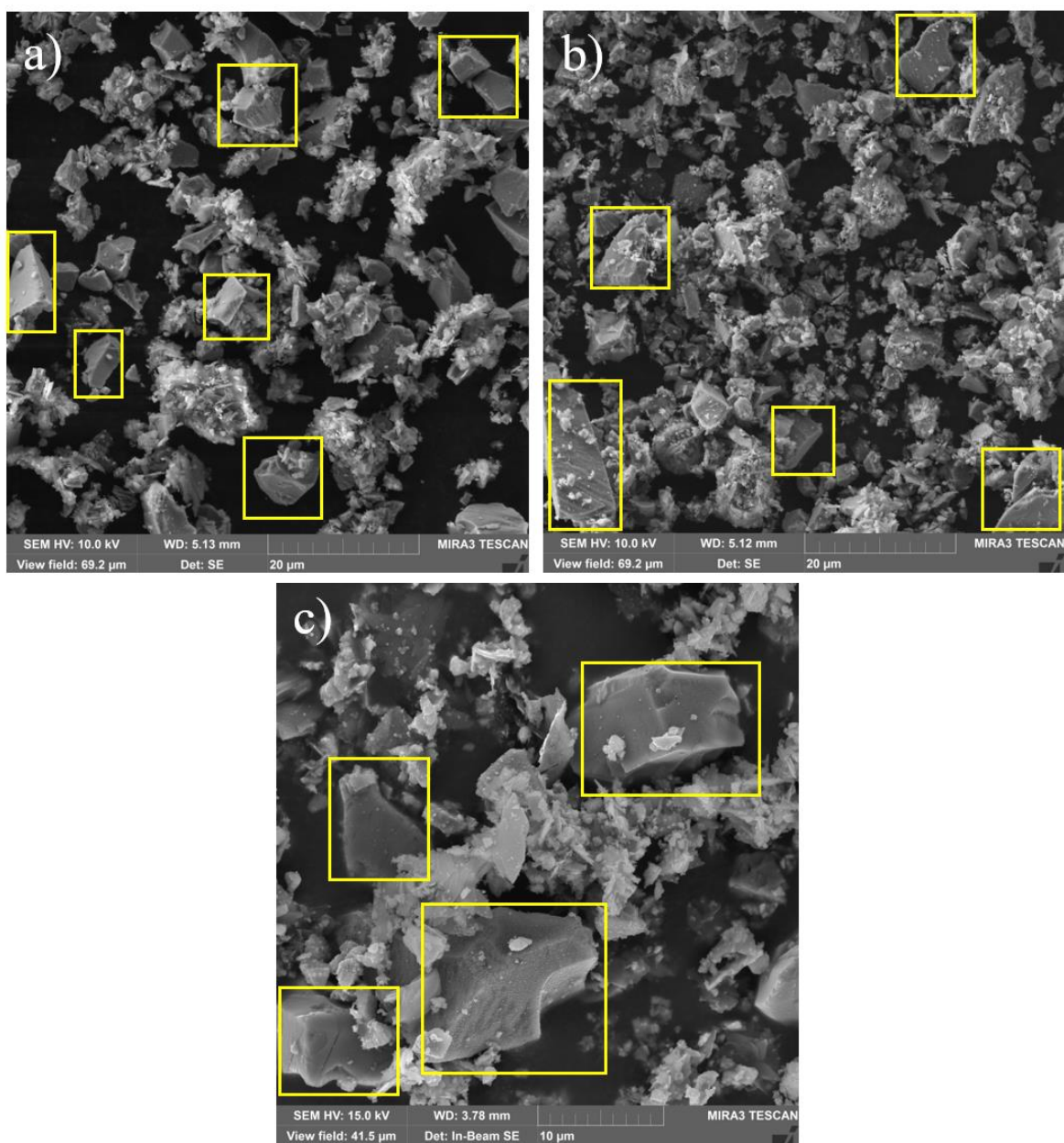
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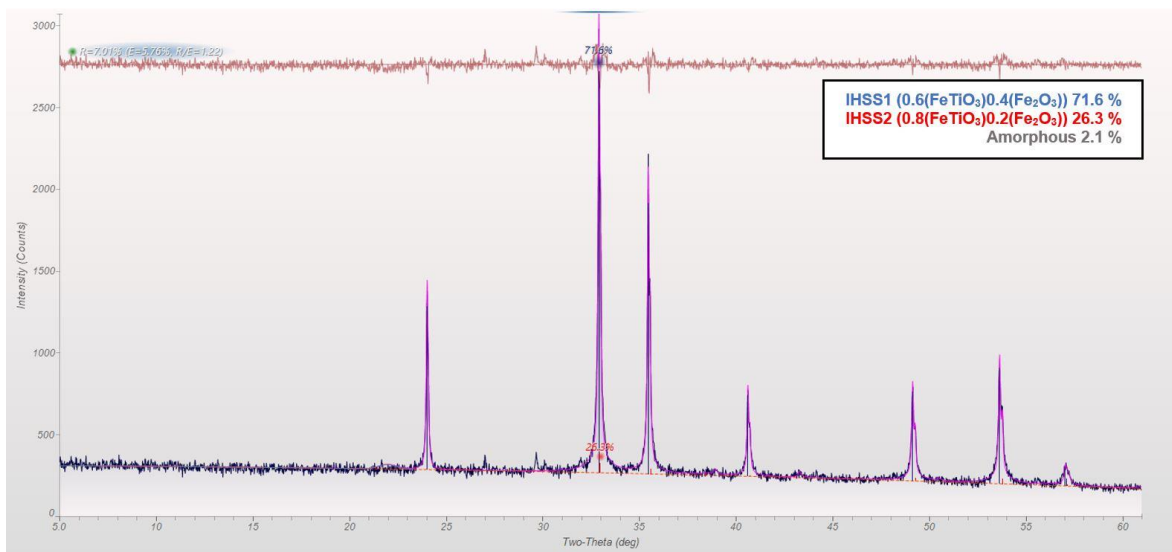
### A. SEM images of additional experiments that tested different KOH-AHT conditions



**Figure S1.** SEM images of KOH-AHTs at 180 °C: (a) KOH (12M) / 72 h; (b) KOH (10M) / 72 h / ~30 bar; (c) KOH (10M) / 72 h + 72 h. The squares show remaining precursor particles.

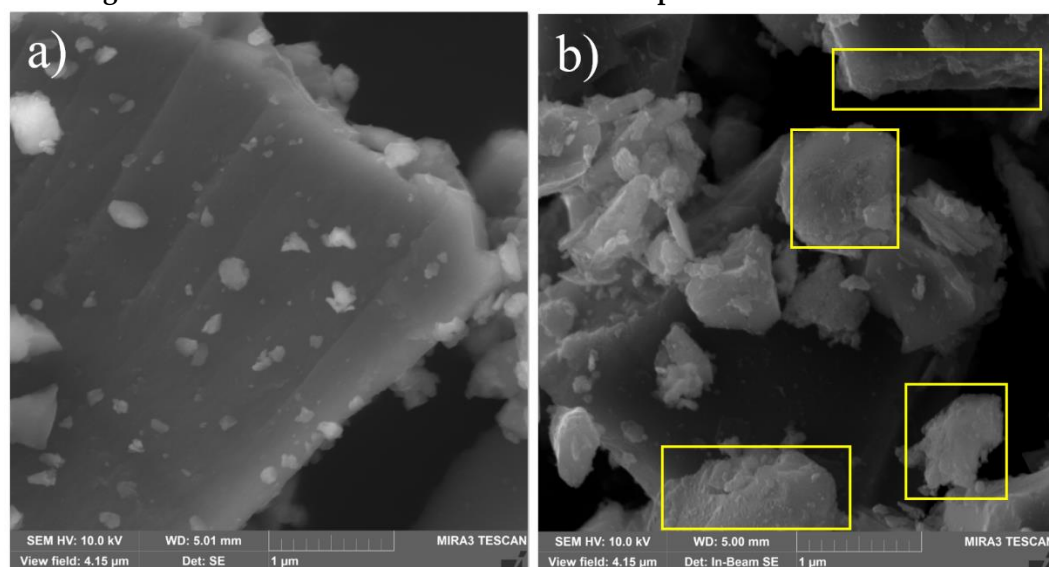
## B. Quantitative XRPD analyses

The quantitative XRPD analysis was performed without considering the trace amounts of orthoclase feldspar and zircon.



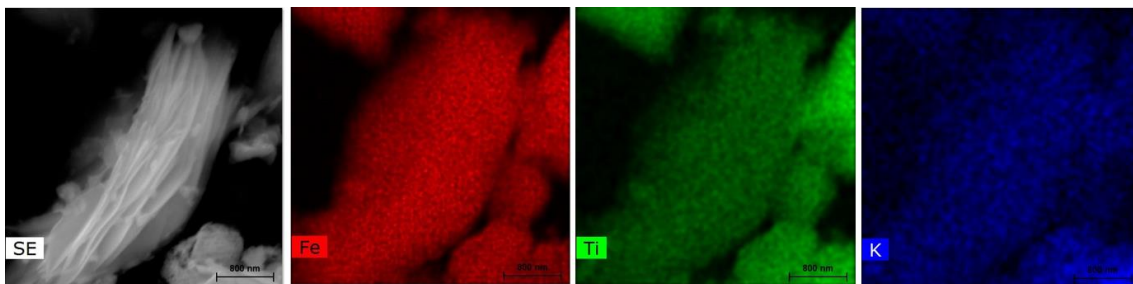
**Figure S2.** Fitting of the Ecuadorian ilmenite sands precursor.

## C. SEM images of the surface of Ecuadorian ilmenite sand particles



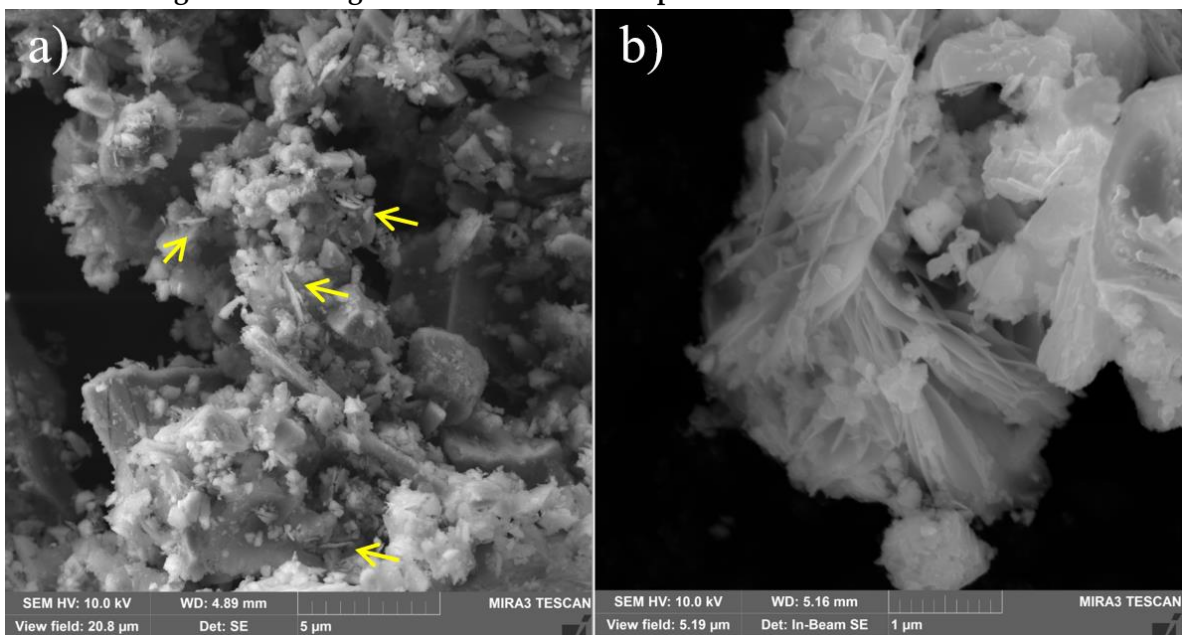
**Figure S3.** SEM images of (a) the surface of the precursor (smooth), and (b) the surface of the remaining precursor after 24 h of KOH-AHT exposure (rougher and flawed areas marked in yellow).

## D. Elemental mapping analysis of the KOH-product obtained at 72 h



**Figure S4.** Elemental mapping analysis of the KOH-product obtained at 72 h.

**E. SEM image of remaining nanosheets of the KOH-product obtained at 96 h**



**Figure S5.** (a,b) Remaining nanosheets within KOH-product obtained at 96 h.