

## Supplementary Information

### Biological Synthesis of Free-standing Uniformed Goethite

#### Nanowires by *Shewanella* sp. HN-41

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From the TGA, a slight weight loss is observed around 100°C, which is attributed to thermal removal of H<sub>2</sub>O adsorbed on the surface of nanowire goethite. The large weight loss between 180°C and 300°C is due to thermal decomposition of goethite, alpha-FeOOH, to iron oxide such as alpha-Fe<sub>2</sub>O<sub>3</sub> (it is because the TGA curves were measured in air flow-rate of 100ml/min) (*Physica B* 390, 23, 2007). The Brunauer-Emmett-Teller (BET) data have been obtained using N<sub>2</sub> gas at 77K after degassing at 150°C for 3 hours. Compared to BET specific surface area of ~34.7 m<sup>2</sup>/g for the chemically-synthesized nanorod goethite, the biogenic nanowire presents much higher BET surface of 82.8 m<sup>2</sup>/g, showing the isotherm profile type-III without any substantial hysteresis loop. (In a comparison, nanorod goethite was chemically synthesized through reaction of Fe(NO<sub>3</sub>)<sub>3</sub> and KOH in solution and its TEM image was present Fig. S1.)

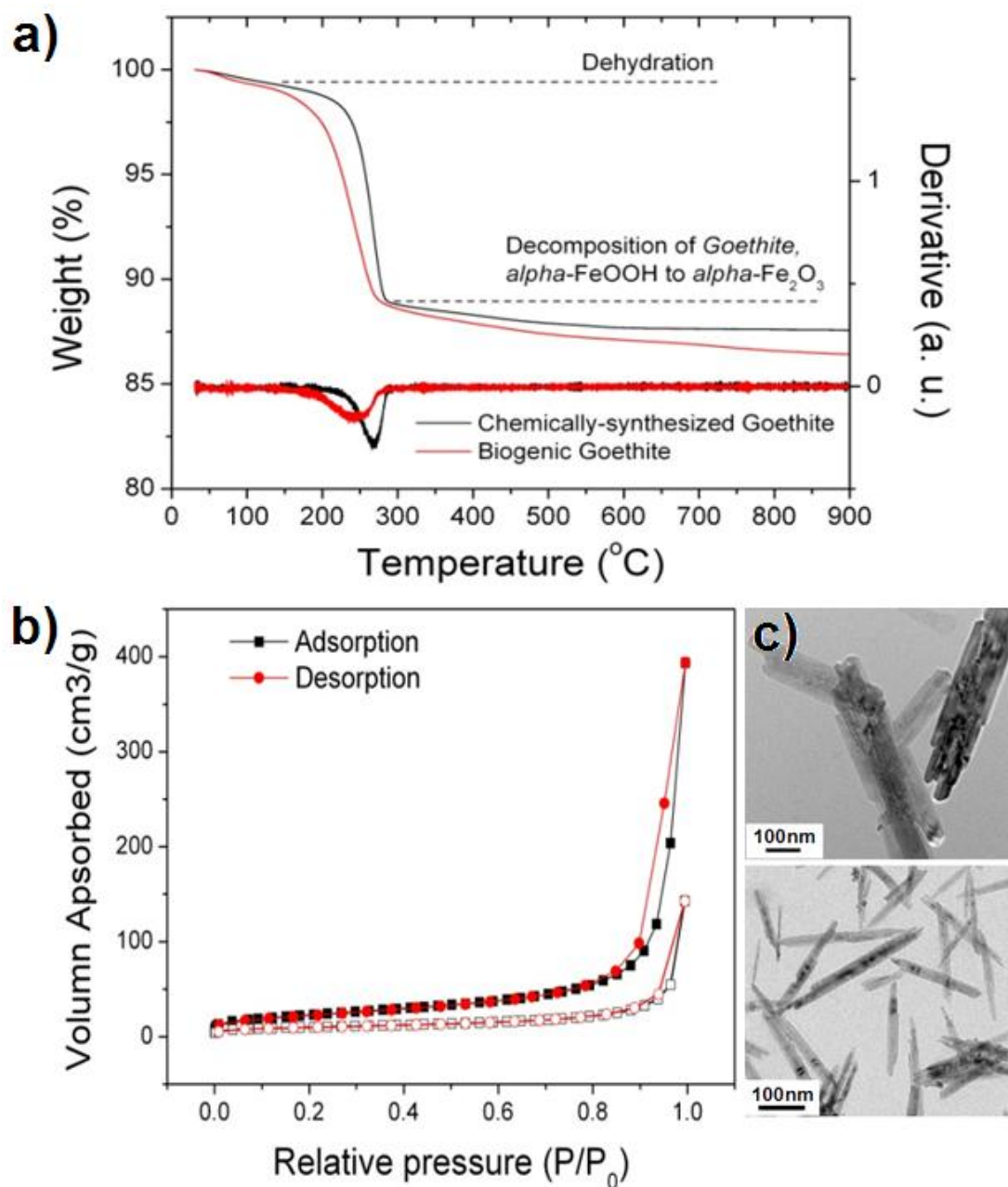


Fig. S1. Thermogravimetric analysis (TGA) (biogenic goethite : red line, chemical goethite : black line) (a), N<sub>2</sub> adsorption-desorption isotherm profiles of biogenic nanowire goethite recorded at 77K (biogenic goethite : filled, chemical goethite : open) (b), and TEM image of chemically-synthesized nanorod goethite (c).