

## Bio-templated Synthesis of Hematite Nanowires for Visible Light Driven Water Splitting

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We report the synthesis of hematite nanowires for visible light driven water splitting by using nanofibrous M13 bacteriophages (viruses) as a template. It was found that ferric ion-containing sol-gel precursors readily interact with M13 viruses through electrostatic interactions, enabling the growth of FeOOH nanowires by controlled hydrolysis and condensation reactions. Annealing of the FeOOH nanowires at high temperatures in air leads to the formation of hematite ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>) nanowires, of which diameter can be varied from few tens of nanometers to hundreds nanometers by controlling the concentration of precursor solution and reaction temperature. We can also fabricate the film composed of interconnected hematite nanowires simply by vacuum filtration. Based on these findings, we tested photocatalytic activity of bio-templated hematite nanowires for visible light driven water splitting. It is thought that the present study can provide a green alternative ways to fabricate various functional nanomaterials, especially oxide nanowires for energy applications.