



Spontaneous growth of ultra-thin titanium oxides shell on Ag nanowires: an electron energy loss spectroscope observation

**於銀奈米線表面之超薄二氧化鈦殼層自發性成長：EELS光譜觀察**

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The performance of nanowires is often limited. One of the important solving methods is to synthesize composite nanowires such as core-shell nanowires to enhance functionality and usability. With respect to the Ag-TiO2 core-shell nanowires, the silver nanowires have unique properties of high surface plasmon resonance as well as good electrical conductivity, while TiO2 is an ideal material as photocatalysts. In the absence of oxide precursors, templates, inoculants and surfactants, Ag nanowires with a spontaneous ultra-thin TiO2 shell (~0.5 nm) can be vertically grown on TiO2 substrate. STEM/EELS results demonstrate that this oxygen-deficient TiO2 layer is formed through the oxidation of Ti which is released from the substrate and segregated to the nanowire surface simultaneously with crystal growth of the nanowires.

為提升奈米線的表現，以核殼結構加強其功能與使用性為一重要做法，以Ag-TiO2核殼奈米線的組合為例，銀具有良好表面電漿共振與極佳電性，TiO2殼層則為光催媒。本研究在不使用氧化物前趨物、模板、成核劑與表面活性劑情況下，於TiO2基板上成功合成表面自發形成~0.5 nm厚殼層之直立Ag@TiO2核殼奈米線。STEM/EELS影像顯示此具高氧空缺之TiO2殼層為基板釋出的鈦於銀單晶成長過程中同步排出至表面氧化而成。