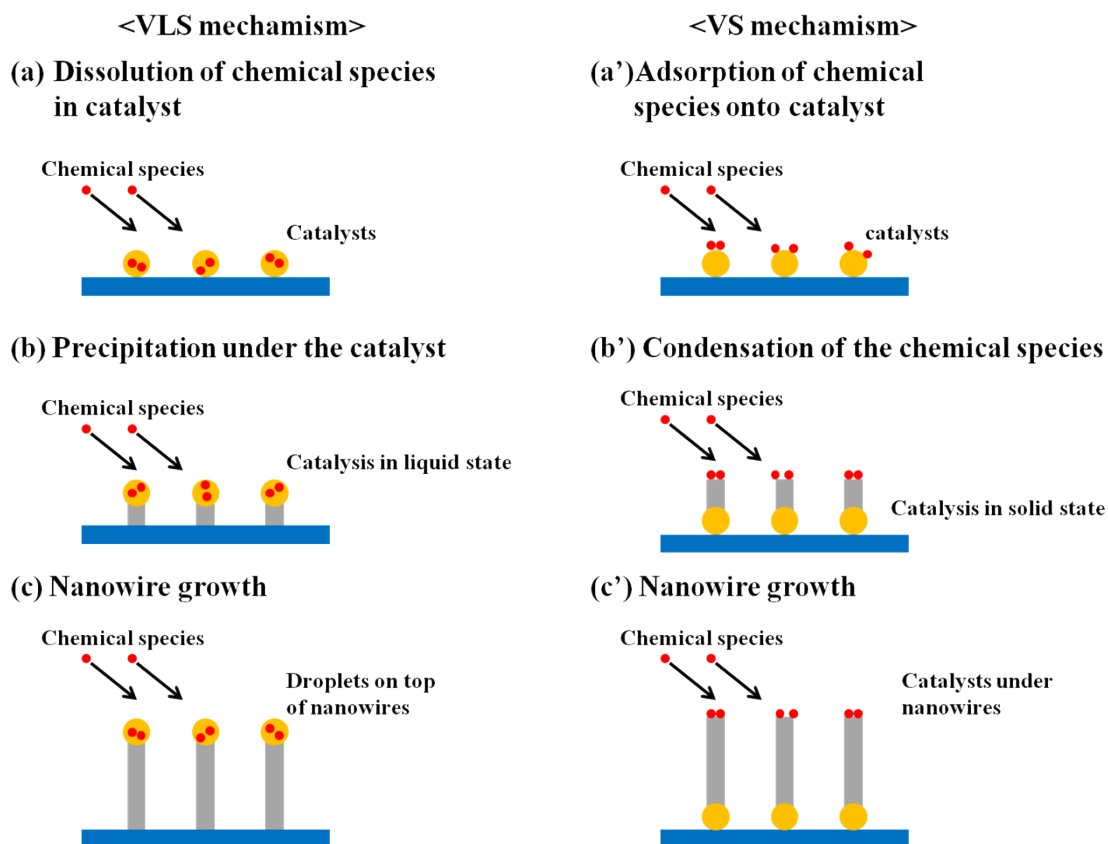


Supplementary information



Scheme S1: Schematic illustration of VLS and VS mechanism.

VLS mechanism: (a) Chemical species dissolve into the catalysts (b) When the chemical species were saturated, the precipitation takes place. Catalysis is in liquid state at elevated temperature. (c) Nanowires keep on growing while chemical species are supplied. In VLS mechanism, droplets are located at the top of nanowires.

VS mechanism: (a') Chemical species adsorb on the catalysts and partially dissolve into them. (b') Condensation takes place at the surface of catalysts. Catalysis is in solid state even at elevated temperature. (c') Nanowires grow by adsorbing chemical species. In VS mechanism, catalysts are a trigger for starting nanowire growth and are located at the bottom of nanowires.

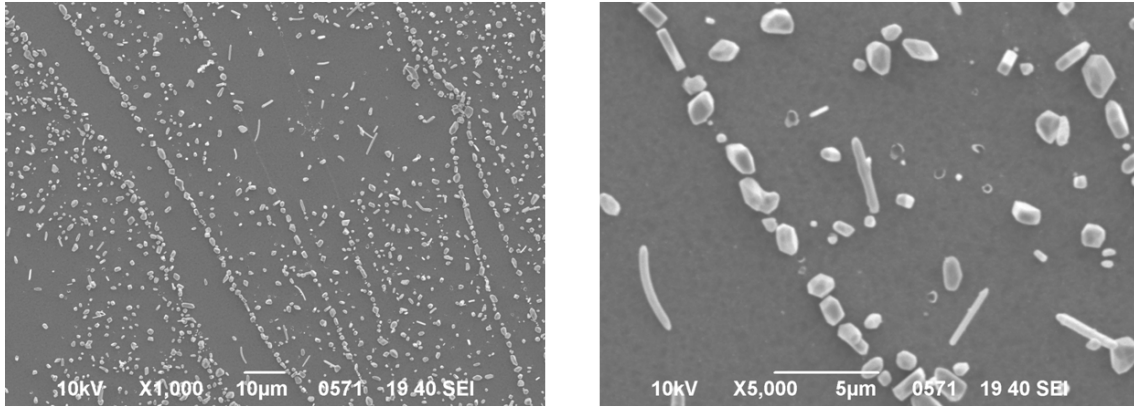


Fig. S1: Surface morphologies after the CVD was carried out at 700 °C for 30 min on Si substrate (different magnification).

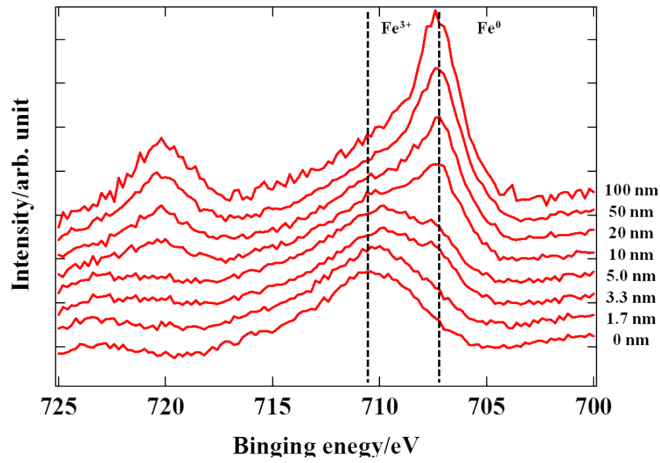


Fig. S2: XPS depth profile of the Fe NW stored in air for 3 days

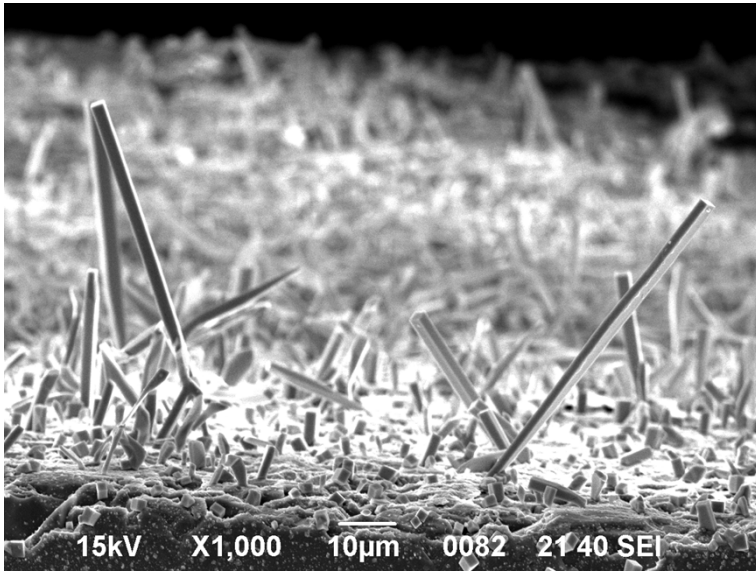


Fig. S3: Fe NWs grown on the edge of C-plane Al₂O₃

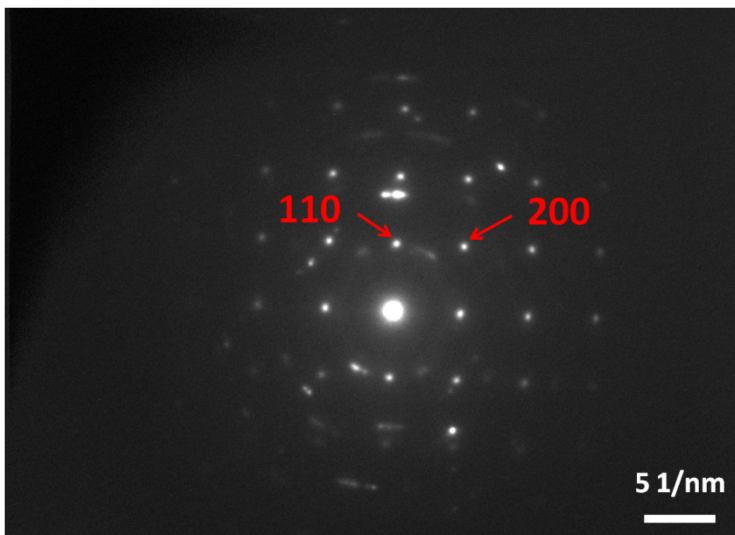


Fig. S4: Electron diffraction pattern of Fe particle

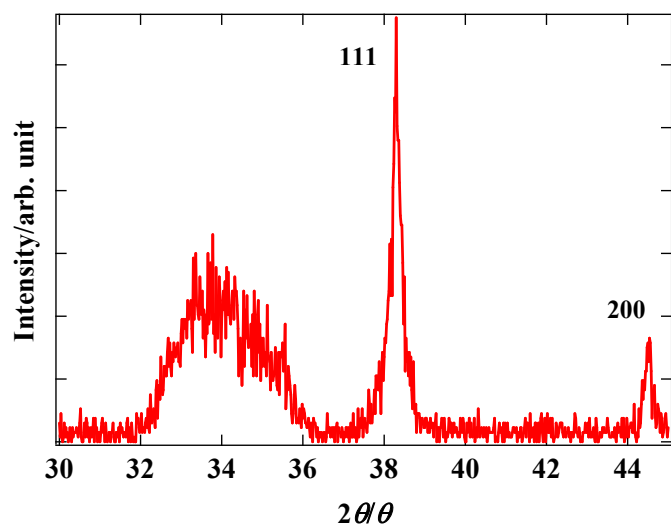


Fig. S5: XRD of the Au islands after annealing at 700 °C for 30 min