Supplementary Information for

Phosphorus stimulated unidirectional growth of TiO_2 nanostructures

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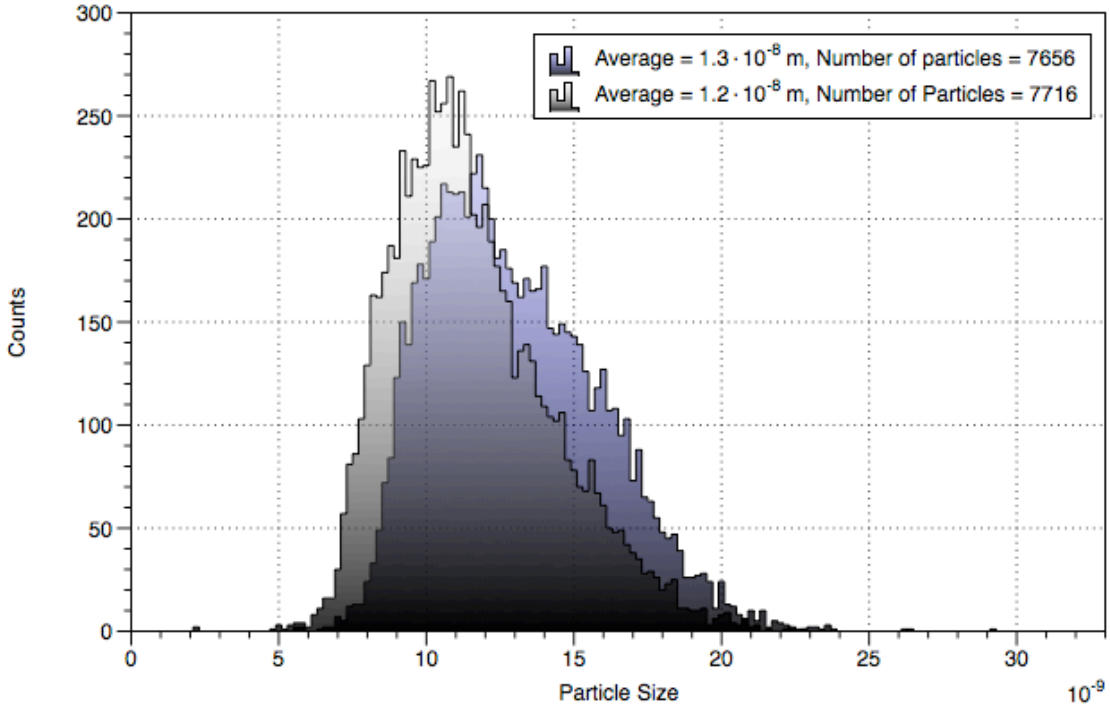

Figure S1: Atomic Force Microscopy histogram showing the average particle sizes for synthesized Ni_xP_y nanoparticles range from 10-12nm.

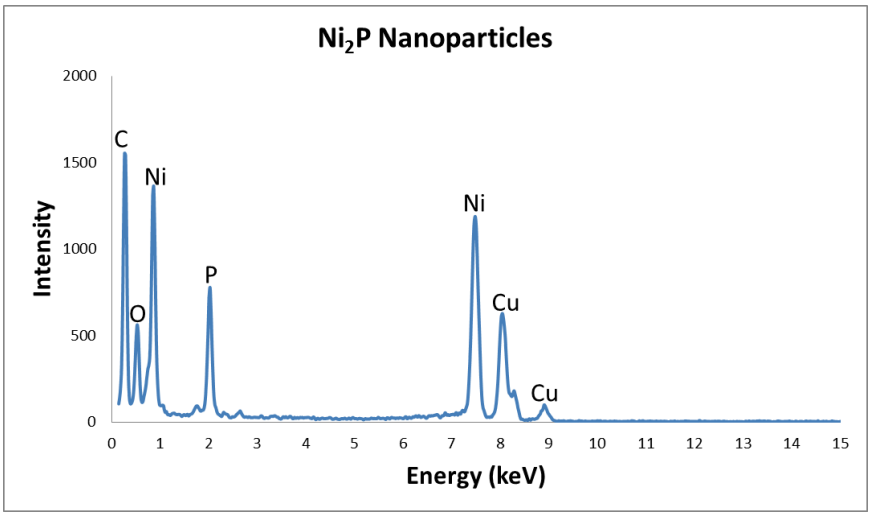

Figure S2: EDS spectra collected from synthesized Ni_xP_y nanoparticles.[15] Spectra show nanoparticle compositions are Ni and P. The carbon and oxygen peaks are attributed to the surfactant surrounding the nanoparticles while copper peaks are attributed to the copper grid upon which the particles were dispersed.

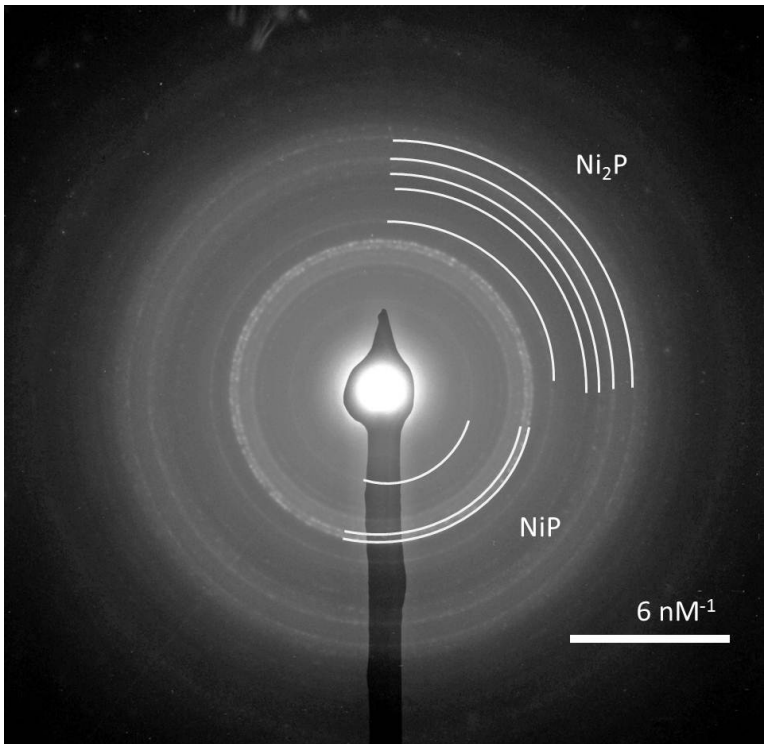

Figure S3: SAED pattern of starting Ni_xP_y nanoparticles. Measured ring diameters fall closely on those reported for Ni_2P [16] and NiP [17].

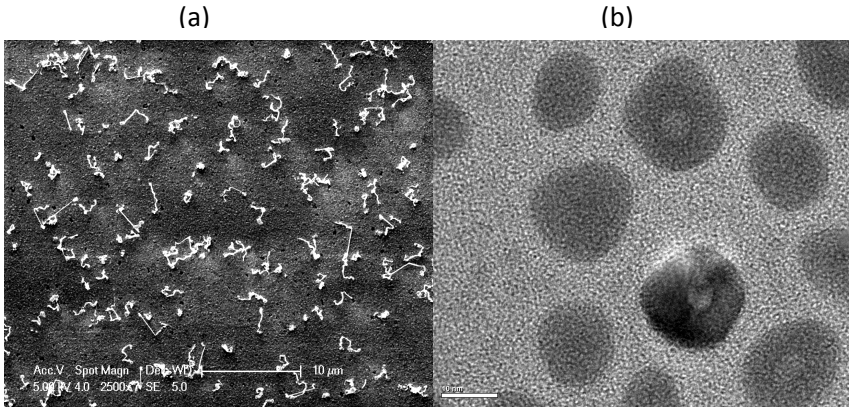

Figure S4: (a) SEM image showing bent nanowires grown from Ni_xP_y seed catalysts. (b) HRTEM image shows catalyst particles used for nanowire growth are actually a mixture of crystalline hollow and solid Ni_xP_y NPs.

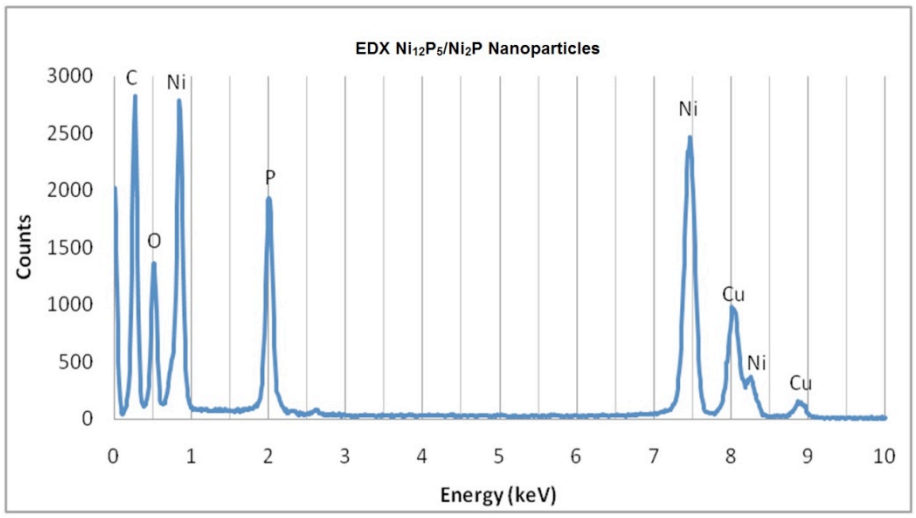

Figure S5: EDX spectrum collected under TEM analysis of starting $Ni_{12}P_5/Ni_2P$ nanoparticles to be used for phosphorus-assisted nanowire growth.

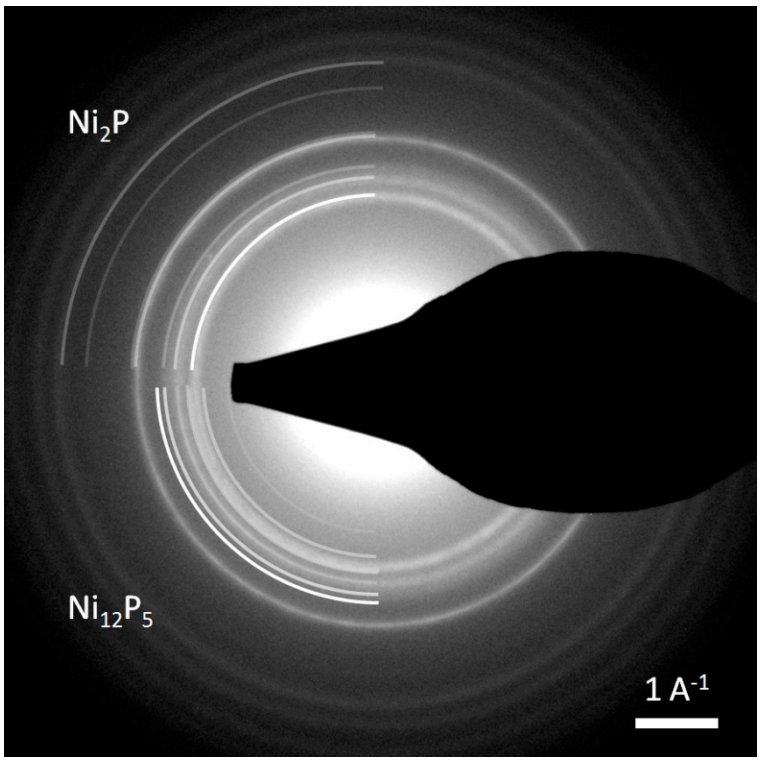

Figure S6: SAED pattern of starting $Ni_{12}P_5/Ni_2P$ nanoparticles. Measured ring diameters fall closely on those reported for Ni_2P. Broadening of some rings may be due to trace amounts of $Ni_{12}P_5$ but the majority of the composition is assumed to be Ni_2P.

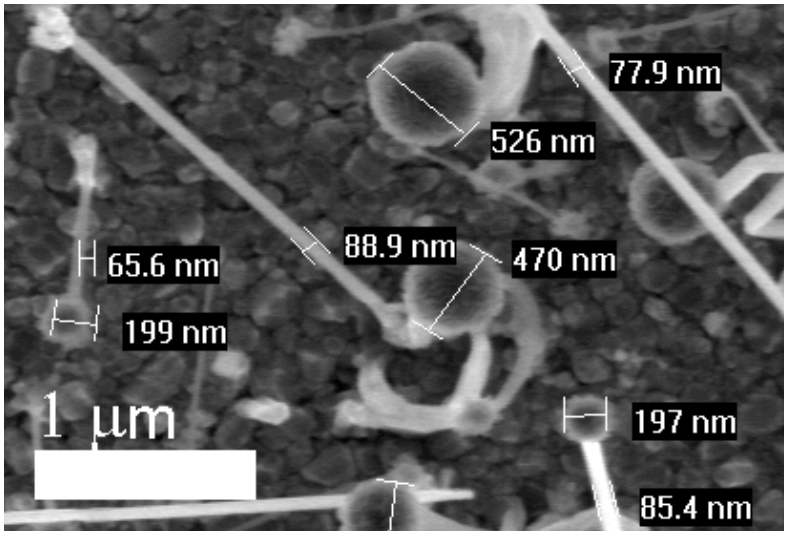

Figure S7: SEM image of nanowires grown from Ni_2P seeds. Seed particle diameters appear different (197nm and 470nm) while nanowire diameters remain closely similar (85.4nm and 88.9nm).

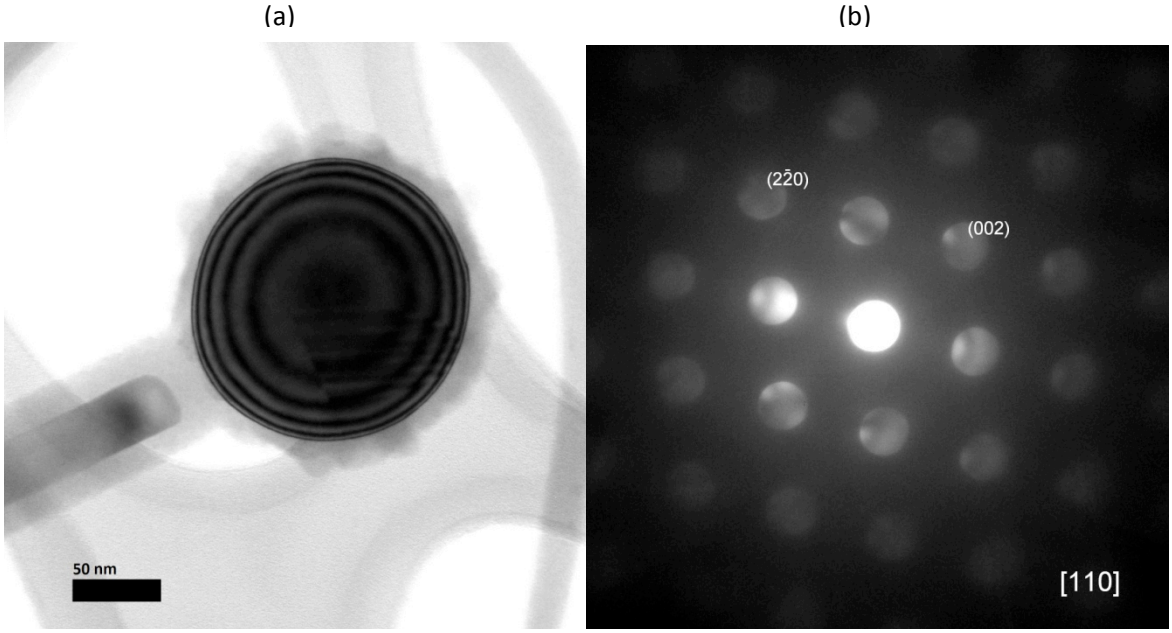

Figure S8: (a) BF TEM image of nanowire fabricated from Ni_2P nanoparticles. (b) CBED pattern of seed particle indicates a Ni composition.

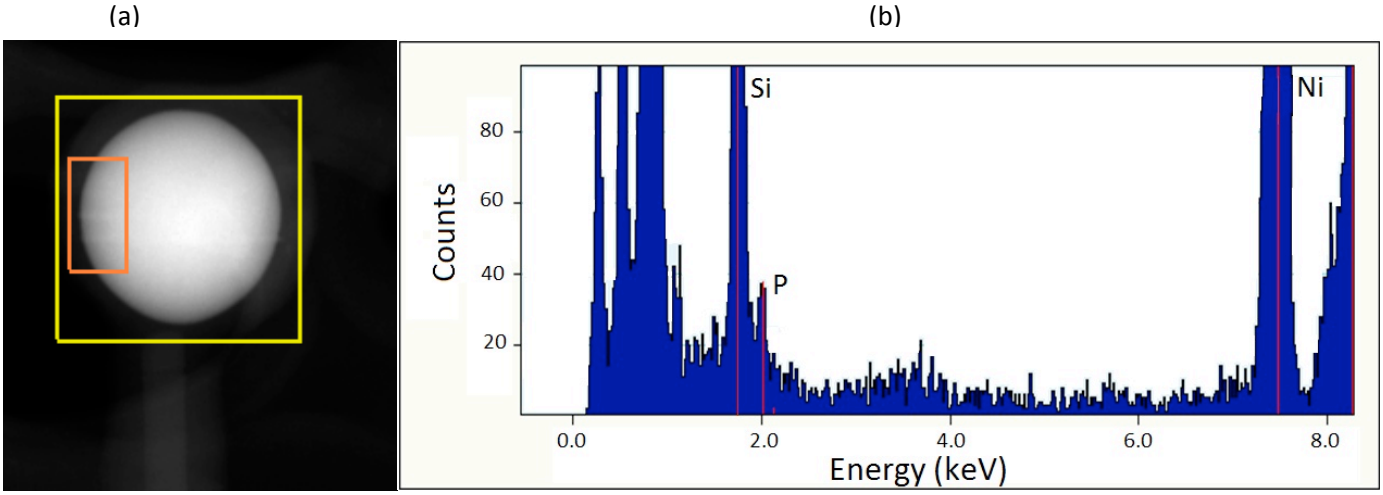

Figure S9: (a) STEM HAADF image of the nanowire and catalyst particle shown in Fig S5. (b) EDX analysis of catalyst particle shown in Fig S5. Line scans show that while SAED patterns indicate the catalyst particle is composed of Ni, a thin shell of P is still present on the exterior of the nanoparticle.