Supporting information

Constant Rate Dissolution of InAs Nanowires in Radiolytic Water Observed by *In situ* Liquid Cell TEM

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1. Transferring NWs by nanomanipulation

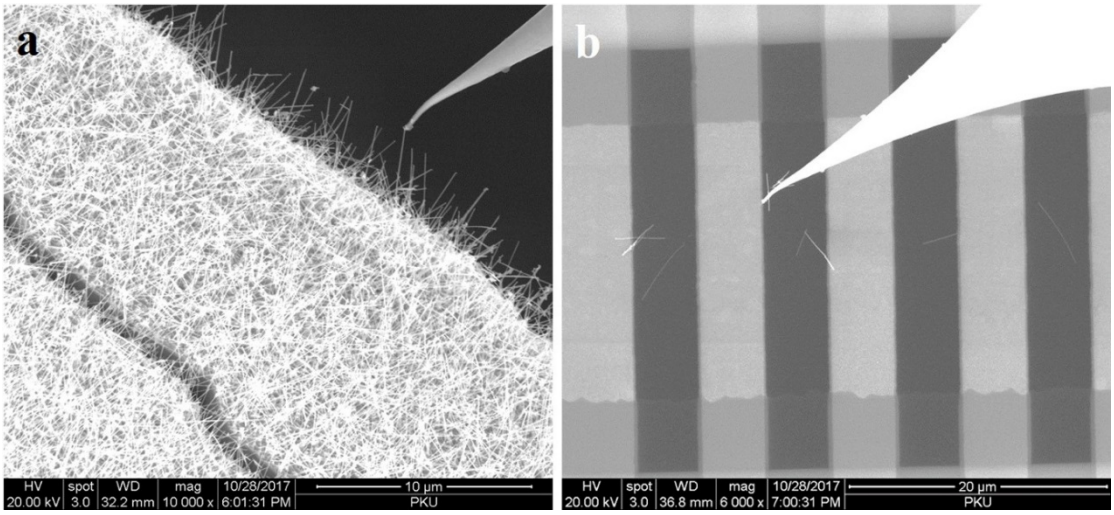

Figure S1. SEM images showing the MBE-grown InAs NWs transferred by nanomanipulation from the substrate (a) to the SiN_x film of a chip (b) for liquid cell TEM experiments.

2. The stability of InAs NWs on SiN_x film under high energy electron beam irradiation

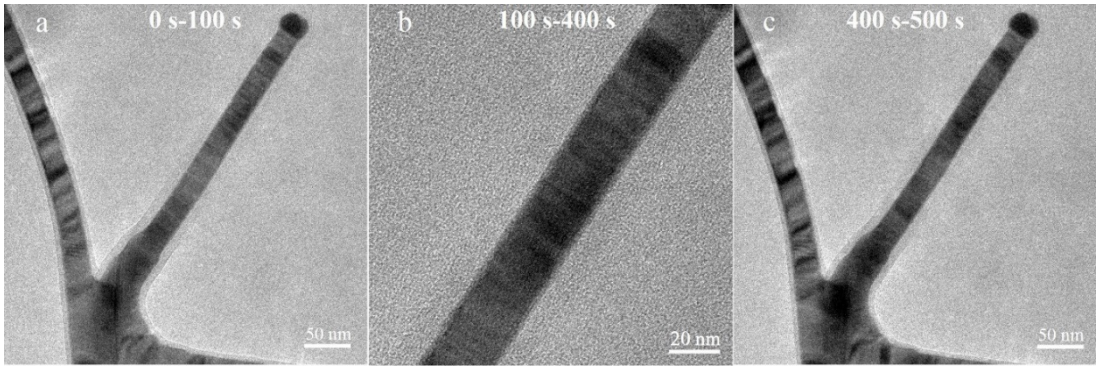

Figure S2. *In situ* observation of InAs NWs on SiN_x film in the vacuum in TEM at different irradiation time. (a) and (c) low magnification TEM images under electron beam irradiation with dose rate of ~163 electrons/$Å^2$·s. (b) high-magnification TEM image of the InAs NW in the center of (a) and (c) under electron beam irradiation with dose rate of ~1800 electrons/$Å^2$·s.

3. The low magnification images (zoomed out) of irradiation area.

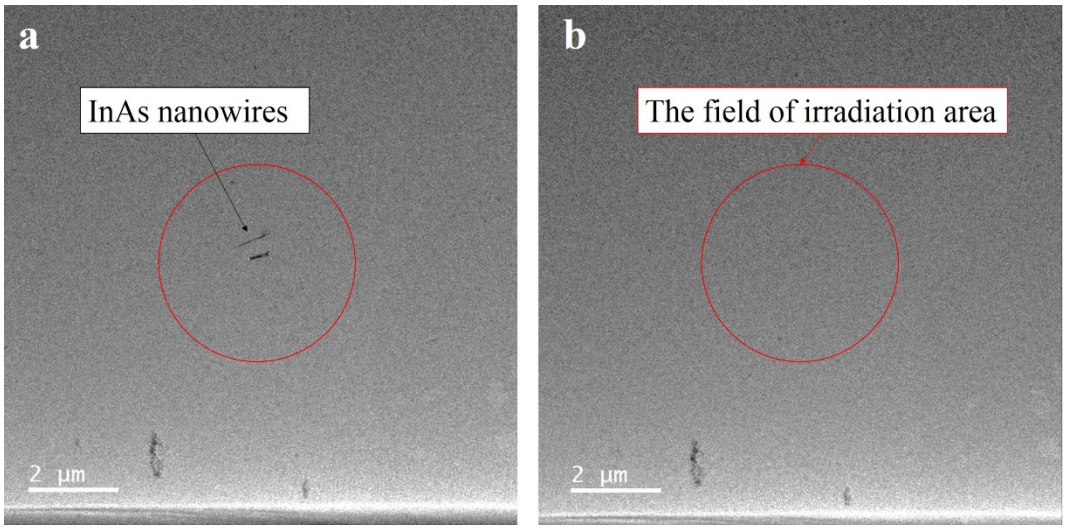

Figure S3. (a) The low magnification TEM image before InAs NWs dissolution. (b) The low magnification TEM image after InAs NWs dissolution. Red circle

indicates the irradiation area of electron beam when InAs NWs dissolved in radiolytic water.

4. The dissolution of other InAs NWs

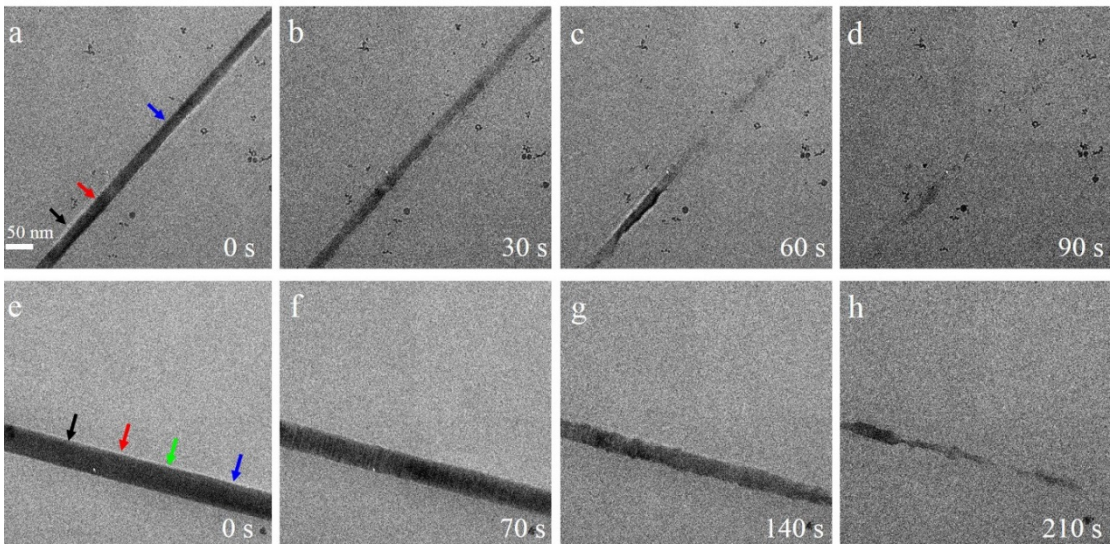

Figure S4. (a)-(d) TEM images showing the change of a MBE-grown InAs NW in radiolytic water with irradiation time. (e)-(h) TEM images showing the change of a MOCVD-grown InAs NW with irradiation time. The scale bar in (a) is 50 nm for all the images.

5. The dissolution of other InAs NWs in the solution with small amount of KCl

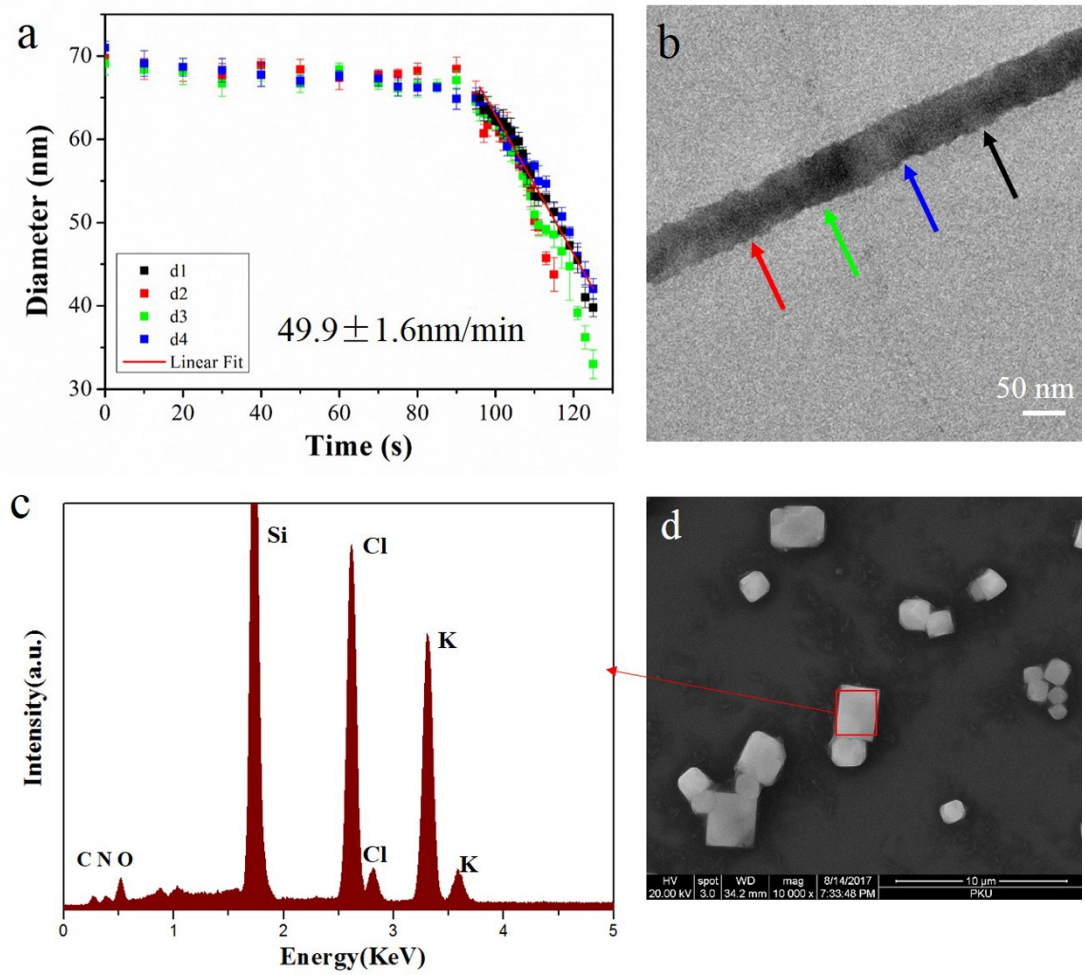

Figure S5. (a) Plots of the diameter of the InAs NW in (b) vs irradiation time. d1, d2, d3 and d4 represent the diameters at different positions on the InAs NW pointed by the black, red, green and blue arrows in (b). (b) TEM image of the InAs NW in radiolytic water. (c) EDS spectrum of the particle on the chip outlined in (d) observed after *in situ* liquid cell TEM experiments. (d) SEM image showing particles on the chip. The EDS spectrum in (c) is taken from the outlined one.