Supporting Information

Effect of Fe-doping on bending elastic properties of single-crystalline rutile TiO_2 nanowires

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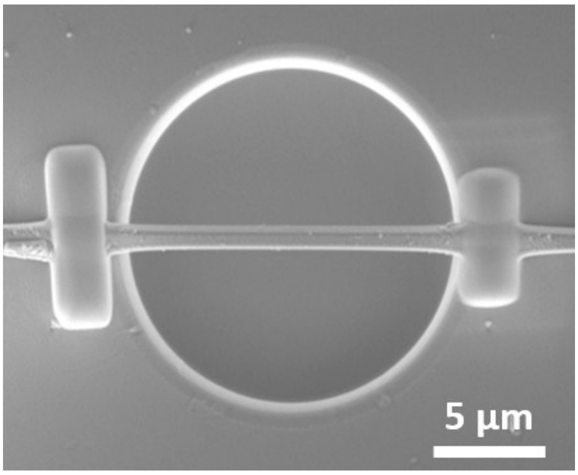

Fig. S1 A TiO_2 NW after three-point bending tests without local residual indentation observed.

Calculation Method of Second Moment

To measure the cross-sectional areas of the NW beams, these NW samples were cut using FIB to expose their cross sections (Fig. S2a). Since the stage of the sample was titled with an angle of 52° to view the cross section, the measurement of the cross-sectional area was corrected via MATLAB. The calculation of the second moment, I, of the cross section is based on that of a polygon. During the MATLAB imaging process, a polygon outlines the projection of the NW's cross section, as is seen in Fig. S2b and S2c. In the calculating process, the loading direction was known normal to the NW beam (x direction), thus I_x that is the component of I was applied in equation (1). As shown in Fig. S2c, the values of A and I_x for this NW were output. This calculation method can remarkably reduce the calculation error of the Young's modulus of a NW with an irregular cross section.

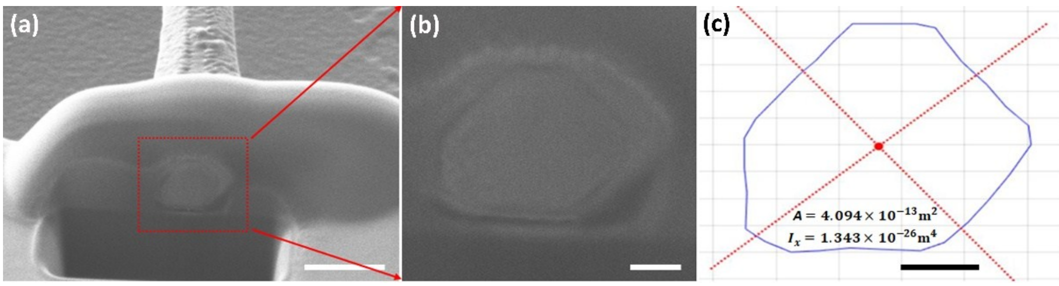

Fig. S2 calculation method of the cross-sectional area and the second moment. (a) SEM image showing that the NW was cut near the welding end. (b) Magnified SEM image of the projection of the cross section. (c) A polygon corresponding to (b) obtained by MATLAB imaging process, outlining the projection of the NW's cross section. Scale bar, 1 μm (a), 200 nm (b) and (c).