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Supporting information for article:

In situ Bragg coherent X-ray diffraction during tensile testing of an individual Au nanowire

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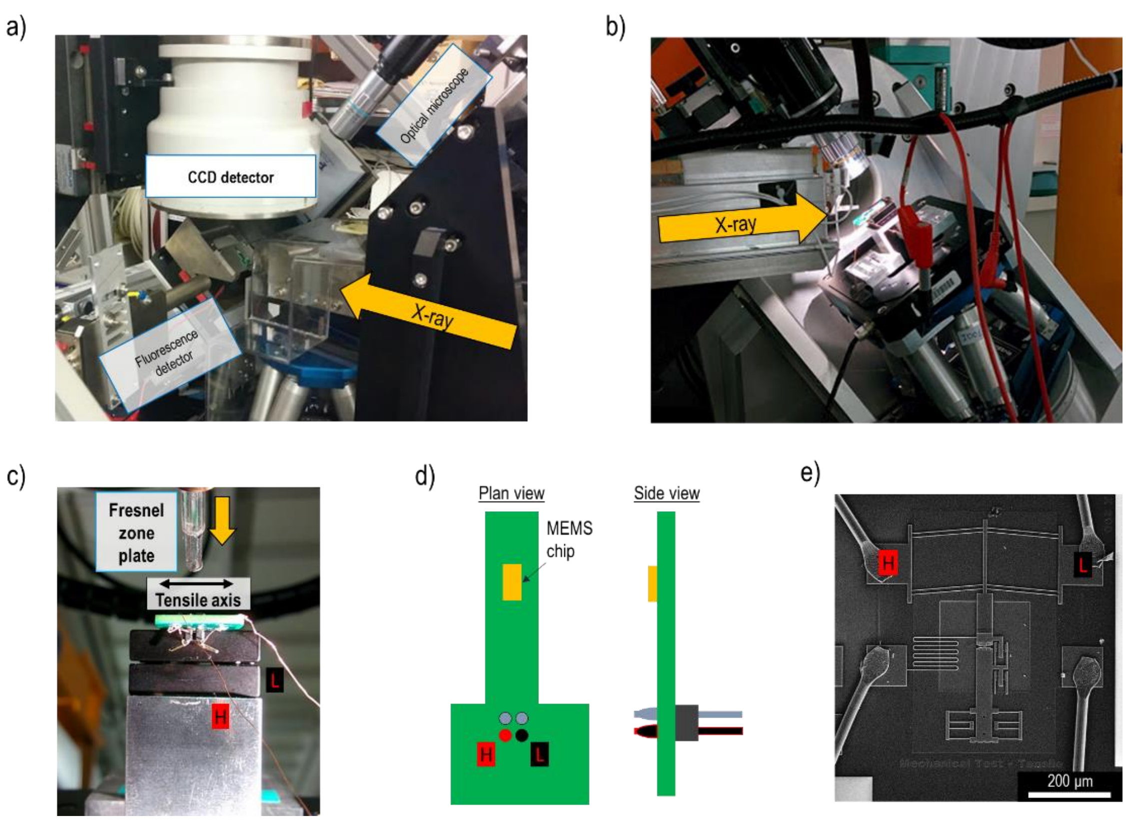
Figure S1. Sample installed a) at BM32 beamline and b) on the ID01 goniometer with incident x-ray direction indicated by the arrows. c) Close-up view of the ID01 sample stage showing the bottom electrical connections. **H** for high voltage and **L** for the drain. d) Drawing of the MEMS chip on the printed circuit board (PCB) and the electrical pins. The MEMS chip is wire bonded to the corresponding electrical pads of the PCB. e) SEM image of the tensile stage. The lower two pads are for the electrical groundings also serving as heat dissipation pathways.



Mechanical property of the coating

The thickness profile of XBID coating was normalized to be applicable to the isostrain composite model. E_{XBID} was calculated from Eq. (1) with the volume fraction measured from the SEM images and reconstructed cross-section of the nanowire (Fig. 1(f)). The tensile lattice strain from the Bragg peak analysis was applied to the model.

$$E_{composite} = E_{Au} \cdot V_{f_{nanowire}} + E_{XBID} \cdot \left(1 - V_{f_{nanowire}}\right) \qquad (1)$$

With the estimated XBID elastic modulus, the yield strength of the nanowire can be extracted by subtracting the load bearing of the XBID from the yield load measured from DIC as seen in Eq. (4).

$$F_{composite} = F_{nanowire} + F_{XBID} \qquad (2)$$

$$\sigma_{nanowire} = \frac{F_{composite} - F_{XBID}}{A_{nanowire}} \qquad (3)$$

$$\sigma_{nanowire} = \frac{F_{composite} - E_{XBID} \cdot \varepsilon_{lattice} \cdot A_{XBID}}{A_{nanowire}} \qquad (4)$$