Nanomaterial analysis by *in situ* TEM

Keywords: Nanotubes, nanowires, nanosheets, transmission electron microscopy

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Background

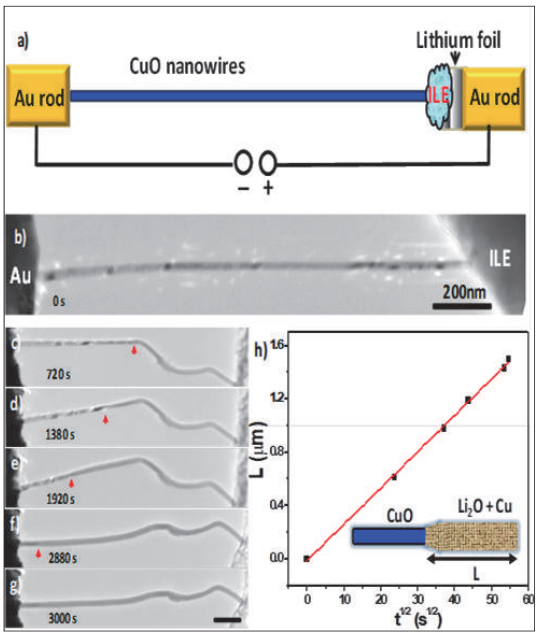
- *In situ* TEM methods have been developed for diverse nanomaterial property studies
- Combination of high spatial, energy and temporal TEM resolutions has been achieved
- Physical, chemical and mechanical properties of nanomaterials have been started to be elucidated

Aim

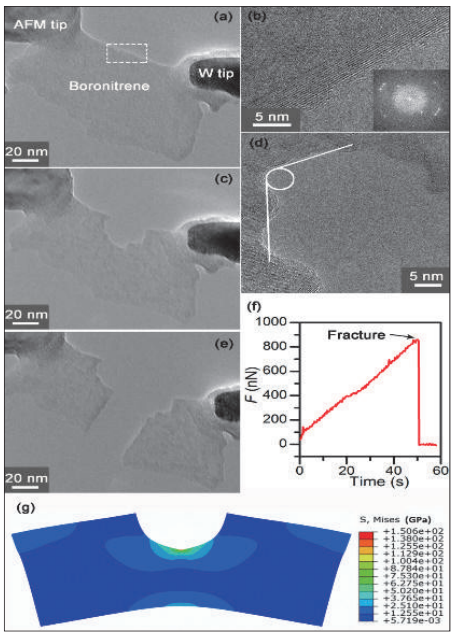
- Obtain the complete knowledge on various nanomaterial properties and functions
- Implement the nanomaterial functions in various modern industries and technologies
- Predict new nanomaterials *via* search and optimization of the measured properties

Advanced Research Topics

Prototype Li-battery lithiation under *in situ* TEM



Fracture toughness of BN nanosheet by *in situ* TEM



Publications

- Nature Communications 8, 13936 (2017); Nature Communications 9, 402 (2018)
- Nano Letters 17, 28 (2017); ACS Nano 11, 558 (2017); ACS Nano 11, 10575 (2017); ACS Nano 12, 4148 (2018)
- Advanced Materials 29, 1606922 (2017); Advanced Functional Materials 28, 1801206 (2018)

Summary

- Pioneering *in situ* TEM methods are designed
- New nanomaterial properties are directly revealed
- Previously unknown property relationships with atomic/defect/interface structures are clarified at the nanoscale

Research outcome

- Prototype optoelectronic devices are created
- Nanostructured advanced composites are made
- Novel nanomaterials for "green energy" fields and applications are developed