UMF Equipment - Protochips Fusion Select System

Heating, Electrical or Electrothermal in TEM

Fusion Select transforms the TEM into an in-situ laboratory using the flexibility of MEMS-based E-chips that deliver accurate, precise experimental conditions. Capable of sourcing and measuring Pico amp level electrical signals and swift temperature changes up to 1200 °C, Fusion Select offers unmatched versatility and capability, accelerating results. The heating E-chips feature a unique silicon carbide heating membrane, which is highly thermally and chemically stable, and are available with a silicon nitride film, an amorphous holey carbon film and through hole. All E-chips can reach up to 1200 °C temperature, heat uniformity, and maintain 5% temperature accuracy.

Features:

Heating: RT-1200 °C
- Accuracy ~5%
- Heating Rate: 1000 ºC/ms

Ultra-Low Drift

EDS & EELS Capable

Operation - Full Software Control

Simultaneous Heating & Electrical Biasing

Please refer to https://www.protochips.com/products/fusion/ for further details of the system.
For any enquiry, please contact Dr. Wei Lu (Tel: 34002077; Email: wei.lu@polyu.edu.hk).

Application:

NATURE COMMUNICATIONS | DOI: 10.1038/ncomms12206

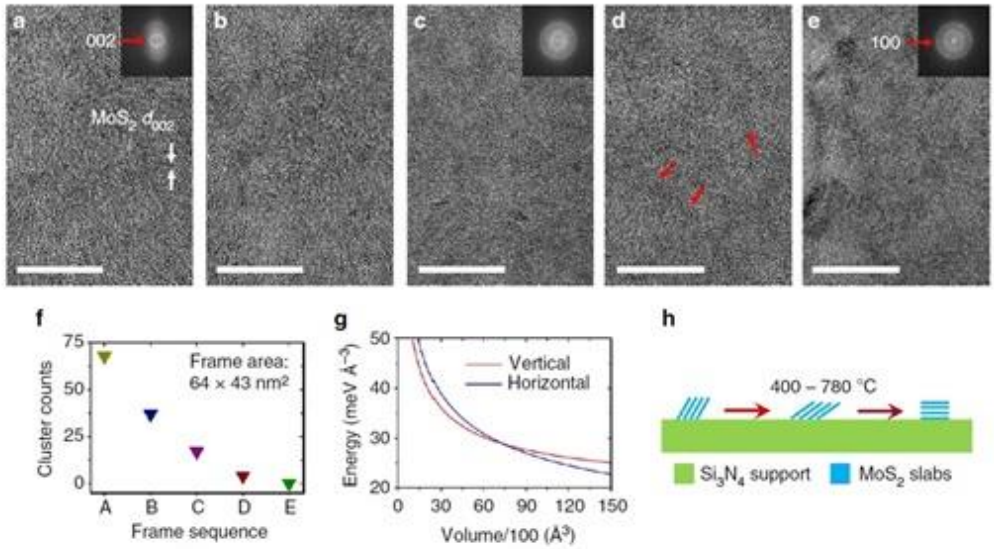

Figure 3 | Vertical-to-horizontal transition from 400 to 780 °C. (**a**–**e**) TEM images versus the increasing temperatures: (**a**) 400 °C, (**b**) 500 °C, (**c**) 600 °C, (**d**) 700 °C and (**e**) 780 °C. The insets in **a**,**c**,**e** are the corresponding fast Fourier transform (FFT) patterns. The red arrows in **d** denote the vertical MoS_2 structures at 700 °C to provide better illustration. Scale bars, 20 nm. (**f**) Statistical distribution of the counts of the vertical MoS_2 flakes in frames **a**–**e**. (**g**) The energy density of MoS_2 structures along two orientations as a function of their volumes, showing the competition of total system energy between the vertical and horizontal structures during crystal growth. (**h**) Schematic process of the vertical-to-horizontal transition.