SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering
Website: https://www.eng.nus.edu.sg/ece/

Area: Microelectronic Technologies & Devices

Host: Dr Feng Xuewei

TOPIC	**:**	**Gradual resistive switching in two-dimensional rhenium disulfide by electron beam irradiation**
SPEAKER	**:**	**Mr Li Sifan** **Graduate student, ECE Dept, NUS**
DATE	**:**	**8 July 2020, Wednesday**
TIME	**:**	**4pm to 5pm**
WEBINAR	**:**	**https://nus-sg.zoom.us/j/4696020553?pwd=eE1xeERMbTgrV29lZG50ZFEvOW9yZz09** **Meeting ID: 469 602 0553** **Password:998274**

ABSTRACT

Despite the state-of-the-art metal-insulator-metal (MIM) memristors mostly rely on the formation of conductive filaments for resistive switching (RS), the vertical MIM memristors suffer from poor switching uniformity, owing to the stochastic nature of filament formation. In view of this, we demonstrated two-terminal lateral memristors based on electron beam irradiated rhenium disulfide (ReS_2), which unveil a unique non-filamentary resistive switching mechanism. The devices exhibit a forming-free stable gradual RS characteristic, and simultaneously achieve a high temporal switching uniformity. The RS is attributed to the motion of sulfur vacancies induced by drain bias in the device, which modulates the ReS_2/metal Schottky barrier height (SBH) at the source and drain contacts. Defect engineering and flake thickness optimization show that irradiation dosage, area and flake thickness are key parameters to improve the RS ratio. In addition, the device is further utilized as an electronic synapse. Long-term plasticity mimicking the behaviors of biological synapse are implemented, manifesting its potential as artificial synapse for energy-efficient neuromorphic computing applications.

BIOGRAPHY

Li Sifan is currently a Ph.D. student in Electrical and Computer Engineering Department, National University of Singapore. His research mainly focuses on the fabrication and characterization of memristive devices based on two-dimensional materials.