CHI Dongzhi
Institute of Materials Research and Engineering (IMRE), A*STAR (Agency for Science, Technology and Research), 2 Fusionopolis Way, Singapore 138634

dz-chi@imre.a-star.edu.sg

Developing manufacturing-viable growth method for 2D semiconducting TMDCs

The unique thickness-dependent properties of semiconducting 2D layered transition metal dichalcogenides (TMDCs) makes them very attractive for the applications to future electronics and smart sensors. While their tuneable bandgaps, large carrier mobility, strong light-matter interaction, mechanical flexibility and optical transparency make them very attractive for applications to nano-electronics, flexible electronics, as well novel opto-electronics, the large surface-to-volume ratio, high chemical stability, and strain dependent-physical properties, as well as piezoelectricity (observed in odd layer number TMDCs) enable them promising candidates for various sensing applications for IoT. Despite all the attractive properties and promising potential, the adoption of 2D TMDCs by industry for technological applications very much depends on the development of scalable/controlled growth technique for the preparation of high quality atomically thin and uniform layers on large area with well controlled layer numbers and grain sizes (and orientation).

In this talk, I will present and discuss recent progress in our effort to develop a scalable growth technique for synthesizing mono- and few-layers of TMDCs, including reactive sputtering deposition and dispersive CVD growth method.