

2D Materials: The Critical Infrastructure for the Future of Technology

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The recent shortage of semiconductor chips has highlighted the critical role that semiconductors play in the world. We are at the most exciting (and challenging) time for microelectronics, the engine that powers modern society, in its entire history. Applications ranging from electric vehicles to security, high performance computing and advanced medical devices all rely on relentless improvements in semiconductor device performance. The performance of silicon-based electronics is however saturating as Si reaches its intrinsic scaling limit. Fortunately, two-dimensional materials are quickly maturing, and getting ready to take the baton. This talk will describe recent work our group at MIT has done to improve the performance of Silicon microchips by leveraging the unique properties of single-layer transition metal dichalcogenides (TMD). In particular, we will discuss the growth and integration technology of TMD materials and devices at the back-end-of-the-line of silicon technology, and its huge impact on the future of microsystems.