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Dielectric Integration in Transition Metal Dichalcogenides Field-Effect Transistors BHIM CHAMLAGAIN, ZHIXIAN ZHOU, Wayne State University — Dielectric plays a crucial role for the scattering of charge carriers two-dimensional transition metal dichalcogenides (TMDs) field-effect transistor channels. The role of various sources of scattering originating from the substrate and the channel/substrate interface such as charged impurities, charge traps, surface roughness, and remote surface optical phonons could be equally important for device performance. On the other hand, miniaturization of device causes the short channel effect. Using high-k dielectric is the proposed solution in this direction but the challenges of high-k dielectric synthesis/growth are important problems to fabricate scalable devices in future electronics. In this work, we will discuss the unique method for the synthesis of high-k dielectric and TMDs field-effect transistor fabrication & characterization by using prepared dielectric.

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