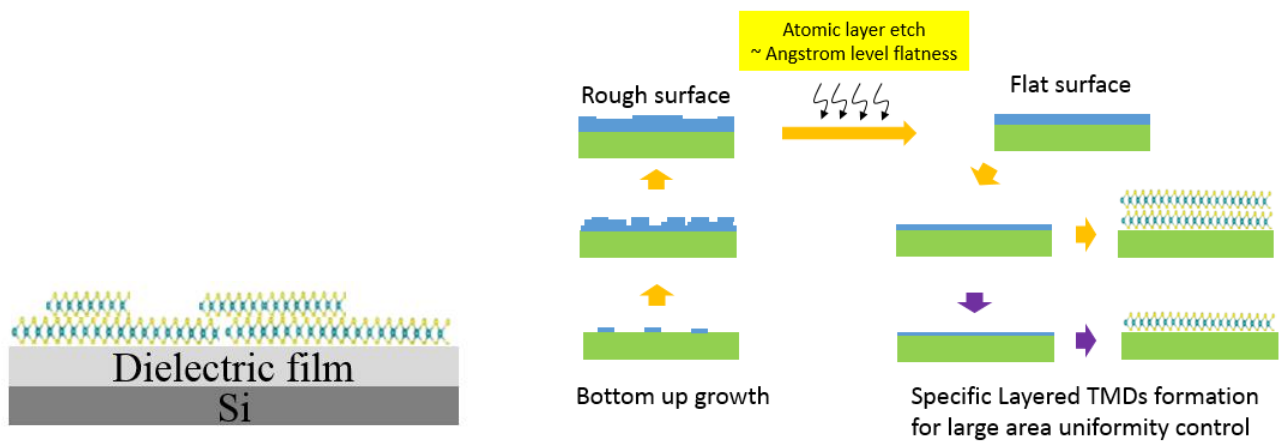

Figure 1. Scheme of large-area and continuous TMDs film synthesized by general CVD nucleation and growth process with local non-uniformity.

Figure 2. Schematic process flow of specific layer TMDs film synthesis with large area uniformity through ultrathin and flat precursor film preparation. An ion-assisted atomic-scale plasma etch is applied for precursor etching. Following by sulphurization process, uniform and layered TMDs can be precisely controlled.

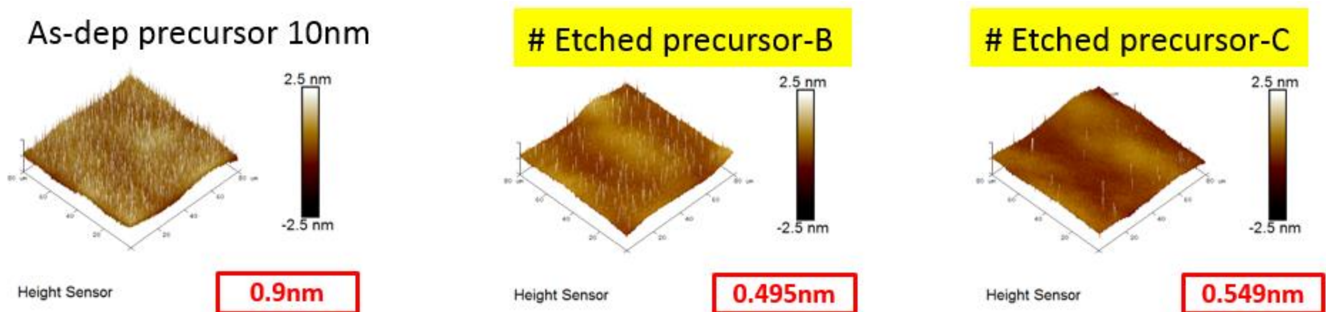

Figure 3. Images of AFM roughness analysis in (a) as-deposited (b) partially etched and (c) heavily etched precursor film (WO_3) treated by ion-assisted plasma etching approach. The rms data for etched WO_3 film are around 0.5nm ± 0.05nm

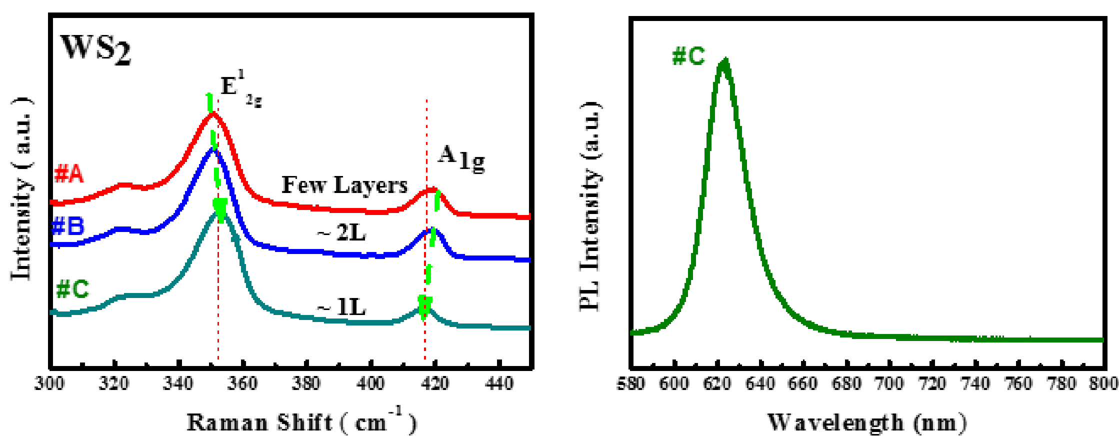

Figure 4. Raman and photoluminescence spectrum of WS_2 film synthesized from the sulphurization of etch precursor films.