ANALYSIS OF CHEMICAL PHASES FORMED IN THIN-FILM METAL/$PtSe_2$ INTERFACES

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The continued miniaturization of electronic devices and the search for alternative systems to complement dominant silicon-based technologies are driving intense research into two-dimensional (20) materials. This class of systems, pioneered by the discovery of graphene [1], now includes a broad range of materials including topological insulators, transition metal dichalcogenides (TMDs),and hexagonal boron nitride (h-BN). Among these, platinum diselenide ($PtSe_2$), is emerging as a particularly promising TMD material due to its high theoretical charge carrier mobility surface chemical stability, and tunable energy bandgap [2-6].

From the application perspective, a comprehensive materials analysis must extend beyond the intrinsic properties of the material to include physicochemical interactions at the interfaces with other components of the device structure. This presentation will discuss in detail the investigations of thin-film metal (e.g., Ti, Cr, Ni, Pt)/$PtSe_2$ interfaces, using Raman and X-ray Photoemission spectroscopy (XPS). These techniques allow for the determination of the chemical composition of the mixed phases formed at the interface and an evaluation of the thermal stability of such systems. Furthermore, complementary microscopic analyses (AFM and SEM) provide insights into surface morphology, features that are fundamental to the successful integration of these systems into next-generation electronic devices.

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