

New 2D dielectrics and magnets for electronic applications

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This presentation will explore recent advancements in the development of high-quality, low-defect 2D magnetic materials. Beyond the well-known classes of transition metal halides and chalcogenides, we will introduce the rapidly expanding category of mixed halogen-chalcogenides. Chromium sulfo-bromide, a key material in this family with an FeOCl structure, exhibits A-type antiferromagnetic ordering at low temperatures. Through exfoliation and defect engineering, this material can transition into a ferromagnetic state. We will discuss the chemistry of CrSBr, including doping and functionalization—both covalent and non-covalent—and its impact on magnetic and optical properties, highlighting potential applications in electronic devices. Additionally, the talk will cover 2D dielectric materials and doping of 2D semiconductors (Figure 1), which play a critical role in device fabrication, showcasing the development and applications of novel high-k 2D dielectrics and large-scale crystal growth of hexagonal boron nitride at atmospheric pressure using diverse metal fluxes [1].

References

[1] A. Söll, E. Lopriore, A. Ottesen, J. Luxa, G. Pasquale, J. Sturala, F. Hájek, V. Jarý, D. Sedmidubský, K. Mosina, I. Sokolović, S. Rasouli, T. Grasser, U. Diebold, A. Kis, Z. Sofer, ACS Nano 18 (2024) 10397

Figures

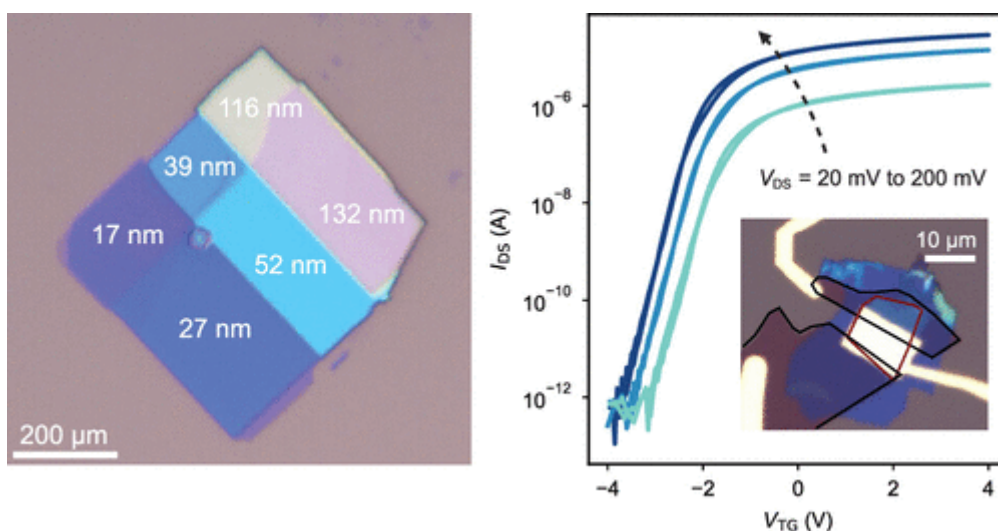


Figure 1: Exfoliated LaOBr layered dielectric and its transistor characteristic in combination with graphene.