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Electrical Transport and Photoresponse of Field-Effect Transistors Based on Two-Dimensional Metal-Layered Materials[1] MING-WEI LIN, IVAN KRAVCHENKO, JASON FOWLKES, Oak Ridge National Laboratory, JIAQIANG YAN, University of Tennessee at Knoxville, XUFAN LI, ALEXANDER PURETZKY, CHRISTOPHER ROULEAU, Oak Ridge National Laboratory, DAVID MANDRUS, University of Tennessee at Knoxville, DAVID GEOHEGAN, KAI XIAO, Oak Ridge National Laboratory — High performance field effect transistors based on exfoliated two-dimensional (2D) layered materials of transition metal dichalcongenides (TMDCs) such as MoS_2, WSe_2 and $MoSe_2$ have been demonstrated. The electrical transport measurements show that the mobility is associated with the thickness and temperature for mono- and few-layered 2D materials. Besides, these 2D materials are demonstrated highly sensitive to the light, providing the potential applications for photodetectors or optoelectronic devices. In addition, the thickness dependence of noise measurement for these 2D materials will also be discussed.

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Ming-Wei Lin
Oak Ridge National Laboratory

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