# Two-Dimensional Oxide Nanosheets: To Graphene and Beyond?

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Two-dimensional (2D) nanosheets, which possess atomic or molecular thickness and infinite planar lengths, have been emerging as important new materials due to their unique properties. In particular, the recent development of methods for manipulating graphene has provided new possibilities and applications for 2D material systems; many amazing functionalities such as high electron mobility and quantum Hall effects have been discovered. This breakthrough has opened up the possibility of isolating and exploring the fascinating properties of 2D nanosheets of other layered materials, which upon reduction to single/few atomic layers, will offer functional flexibility, new properties and novel applications. We are working on the creation of new oxide nanosheets and the exploration of their novel functionalities in electronic applications [1,2]. Recently, we found that titania- or perovskite-based nanosheets exhibit superior high- performance ($e_r$ = 100–320) even at a few-nm thicknesses, essential for next-generation electronics [3]. Additionally, nanosheet-based high- capacitors exceeded textbook limits, opening a route to new capacitor devices. One more interesting concept using 2D oxide nanosheets is designing complex nanodevices and superstructured nanohybrids such as all nanosheet FETs [2], artificial ferroelectrics [4], spinelectronic devices [5], magneto-plasmonic metamaterials [6], Li-ion batteries [7] etc. With these unique aspects, 2D nanosheets will become an important research target in the form of "oxide graphene".

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