

Applications of 2D Materials Beyond Graphene

Kraig Andrews

February 26, 2015

1. TMDs
2. Compare 2D materials to properties of graphene
3. Why are 2D material significant
 - (a) Electronic device applications
4. Fundamental materials
5. State of the art (“cutting-edge”)
6. Problems/Outlook:
Contacts, interface, controlled doping, etc...
7. Citations: [1, 5, 2, 4, 3, 6]

References

- [1] Deji Akinwande, Nicholas Petron, and James Hone. Two-dimensional flexible nanoelectronics. *Nature Communications*, 5, 2014.
- [2] Sheneve Z. Butler, Shawna M. Hollen, Linyou Cao, Yi Cui, Jay A. Gupta, Humberto R. Gutierrez, Tony F. Heinz, Seung Sae Hong, Jiaxing Huang, Ariel F. Ismach, Ezekiel Johnston-Halperin, Masaru Kuno, Vladimir V. Plashnitsa, Richard D. Robinson, Rodney S. Ruoff, Sayeef Salahuddin, Jie Shan, Li Shi, Michael G. Spencer, Mauricio Terrones, Wolfgang Windl, and Joshua E. Goldberger. Progress, challenges, and opportunities in two-dimensional materials beyond graphene. *ACS Nano*, 7(4):2898–2926, 2013. PMID: 23464873.
- [3] A.K. Geim and I.V. Grigorieva. van der waals heterostructures. *Nature*, 499:419–425, 2013.
- [4] Dominik Lembke, Simone Bertolazzi, and Andras Kis. Single-layer mos2 electronics. *Accounts of Chemical Research*, 48(1):100–110, 2015. PMID: 25555202.
- [5] Ruben Mas-Balleste, Cristina Gomez-Navarro, Julio Gomez-Herrero, and Felix Zamora. 2d materials: to graphene and beyond. *Nanoscale*, 3:20–30, 2011.
- [6] Qing Hua Wang, Kourosh Kalantar-Zadeh, Andras Kis, Jonathan N. Coleman, and Michael S. Strano. Electronics and optoelectronics of two-dimensional transition metal dichalcogenides. *Nature Nanotechnology*, 7:699–712, 2012.