

Organically-derived polyelectrolytes for ionic-gated devices

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Electrolyte-gated semiconductor devices have been long dominated by ionic liquids and gels whose high capacitance, excellent performance and ease of use have made them the gold standard [1]. Alternatively, polyelectrolyte materials provide an ionic transport system where water donates the ionic charge. These materials have been explored for metal oxides and polymer electrolytes, but less-so for 2D materials such as graphene [2].

Interestingly, the polyelectrolyte class of materials includes many organically derived materials such as chitosan, starches, alginates, and other proteins [3]. In this talk we will examine and compare the performance of a variety of artificially and biologically derived polyelectrolytes for use with graphene (and other 2D materials). Capacitor, transistor, and electrochromic devices are fabricated and critically reviewed.

References

- [1] Science, **356**, (2017), 69
- [2] J. Mater. Chem. C, **9**, (2021), 9348
- [3] npj Flexible Electronics, **5**, (2021), 13