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Mixed conduction in conjugated polymers devices

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Conjugated polymers have found a fertile field of application in bioelectronics^[1]. Their ability to change doping state after injection of ions from an electrolyte (the so-called electrochemical doping process) makes them versatile transducers of ionic-to-electronic conduction. This process is at the heart of most bioelectronic devices. I will present a device-level description of this process, where electronic and ionic carrier injection/extraction is followed by bipolar transport and compensation, and discuss the role of extrinsic processes including electrolysis and charge transfer to species in the electrolyte^[2]. Experiments and simulations will show the relative importance of these processes in typical materials systems.

References

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- [2] M. Berggren and G.G. Malliaras, "How conducting polymer electrodes operate", *Science* **364**, 233 (2019).