What could be better than graphene for energy storage?

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Abstract (Arial 10)

Graphene seems to be by all accounts the advanced material of choice for years to come. Its unique combination of mechanical, electrical, optical and chemical properties add to its chemical simplicity to incite potential applications in a wide variety of applications from flexible electronics to biomedicine to energy.
In the field of energy, and in particular for energy storage, graphene is no exception and it has already been claimed as a champion material for supercapacitors providing large active area for capacitive double-layer storage. What then could be better than graphene for energy storage?
Hybrid materials offer the opportunity of building synergies thus leading to improved performance over their individual components.[1] In that way, hybrids based on graphene and a variety of molecular species[2.3] or extended phases[4] have been used to design materials with enhanced activity. A wise choice of electroactive species can for instance improve the energy density of graphene-based supercapacitors through hybridization. Furthermore, in our group we have gone beyond the conventional solid state electrode format and have developed graphene electroactive nanofluids as liquid electrodes for flow cells. This novel electrode format is also prone to the development of hybrid materials. In this conference this general hybrid approach, with some emphasis on our own group results will be presented in relation to graphene-based materials for energy storage and illustrative examples discussed.

References

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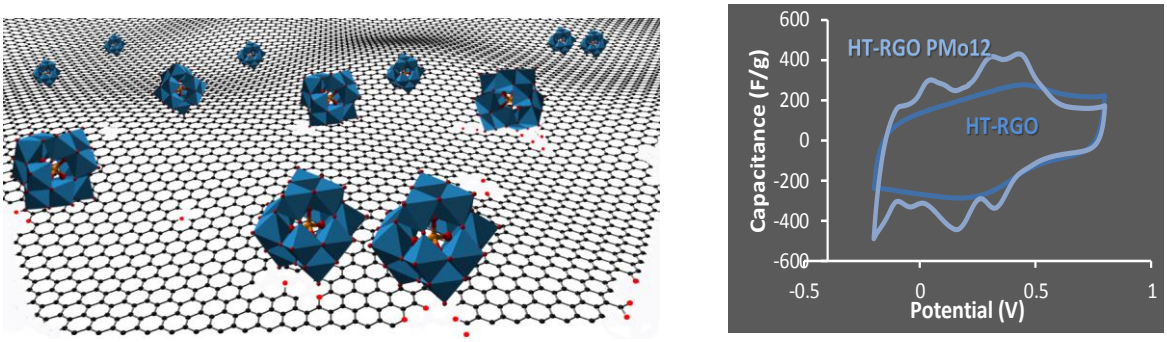

Figure 1. Reduced graphene oxide modified with polyoxometalates (left) lead to hybrid (faradaic + capacitive) energy storage as shown on the Cyclic Voltammogram on the right