

Curved Graphene in Ultracapacitors: High Power Energy Storage

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Ultracapacitors or Supercapacitors are high power energy storage devices. As they store energy electrostatically instead of electrochemically, they excel in lifetime, robustness and power capabilities when compared to Lithium Ion Batteries (LIBs). [1] State-of-the-art Ultracapacitors as found on the market today generally rely on activated carbons (ACs) as active materials. As they exhibit a large surface area and a decent conductivity, activated carbons were the material of choice for latest generations of Ultracapacitors. Given their overall characteristics and their limitations based on the properties of their natural occurring precursors, ACs have begun to reach their limits regarding energy density and power capability.

Skeleton Technologies is the first producer of Ultracapacitors addressing this issue. With its patented “curved graphene” active material, Skeleton Technologies is the only producer of Ultracapacitors that produces its own proprietary active material. The material exhibits a high surface area and can be tuned in its pore size while exhibiting a narrow pore size distribution.

As pore size and, more importantly, pore size distribution significantly influence energy storage capabilities in Ultracapacitors [2], “curved graphene” enables Skeleton’s Ultracapacitors to reach much higher values for specific and volumetric energy as any state-of-the-art product. At the same time, “curved graphene” does not decrease the power capabilities of the final device.

The application of “curved graphene” in large industrial Ultracapacitor cells has been shown to yield an increase of up 40% in energy storage capabilities while retaining Skeleton’s cells’ excellent power capabilities.

References

- [1] Béguin F., Presser V., Balducci A., Frackowiak E., *Adv. Mater.*, 14 (2014) 2219–51.
- [2] Pohlmann S., Ramirez-Castro C., Balducci A., *J. Electrochem. Soc.* 162(5) (2015) A5020–A5030.

Figures

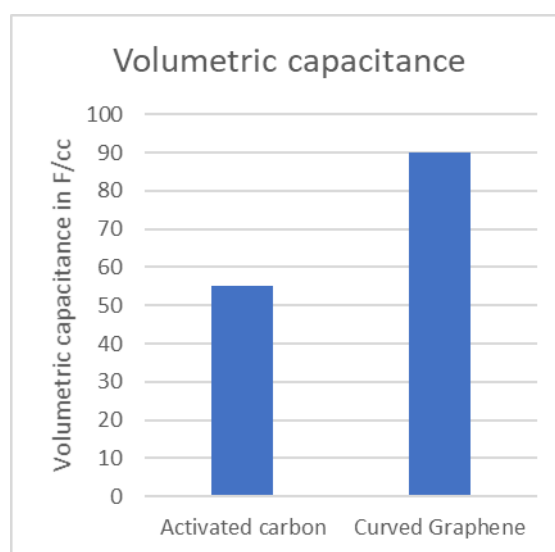


Figure 1: Increased volumetric capacitance achieved in Curved Graphene electrodes.