



Carbon Volume 192, 15 June 2022, Pages 153-161

Ultra-high energy stored into multi-layered functional porous carbon tubes enabled by high-rate intercalated pseudocapacitance

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Received 10 December 2021, Revised 2 February 2022, Accepted 17 February 2022, Available online 25 February 2022, Version of Record 4 March 2022.



https://doi.org/10.1016/j.carbon.2022.02.042

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## Highlights

- The multi-layered, mesoposous, functional carbon tubes with a density of 1 g  $\rm cm^{-3}$  is derived from Mushroom.
- We report a high gravimetric and volumetric capacitance of 995 F  $\rm g^{-1}$  and 895 F  $\rm cm^{-3}$  respectively.