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英文标题：Scalable syntheses of three-dimensional graphene nanoribbon aerogels from bacterial cellulose for supercapacitors

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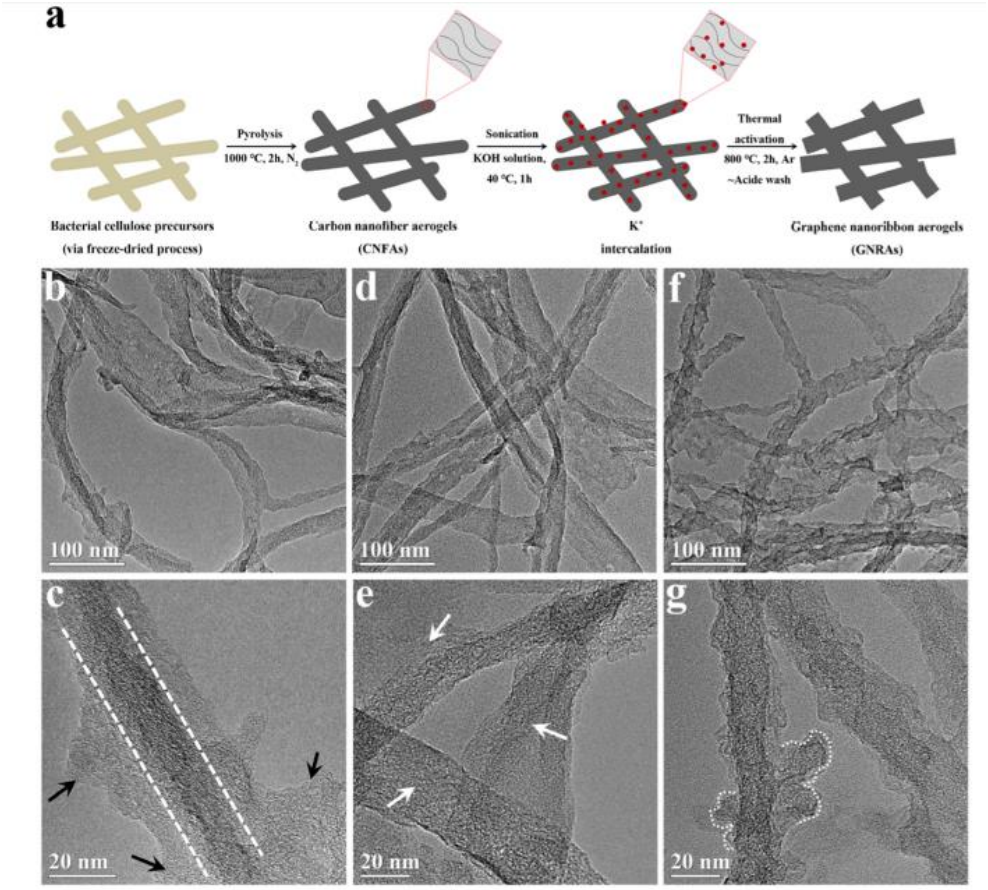
关键词： scalable syntheses; three-dimensional; graphene nanoribbon aerogels; bacterial cellulose; supercapacitors

代表图：



摘要： Three-dimensional (3D) carbon aerogels with well-defined structures, e.g. high specific surface area (SSA), appropriate pore size distribution, good electrical conductivity and ideal building blocks, have been regarded as promising electrode materials or substrates for incorporation with pseudocapacitive materials for energy storage and conversion applications. Herein, we report a simple and scalable sonochemical method followed by a chemical activation process to transform bacterial cellulose-derived carbon nanofiber aerogels (CNFAs) into 3D graphene nanoribbon aerogels (GNRAs) for supercapacitors. Benefiting from a high SSA, reasonable pore size distribution and good conductivity, the GNRA electrode demonstrates a long cyclability, good rate capability and high charge storage performance for supercapacitors, yielding more than 1.5 times (three-electrode cell) and 2.6 times (two-electrode cell) the gravimetric capacitance of the CNFA electrode. In addition, a hybrid Ni-Co layered double hydroxides (LDHs)@GNRAs electrode achieves an impressive gravimetric capacitance of 968 F g^{-1} (based on the mass of the active material) at a current density of 1 A g^{-1}. Moreover, an asymmetric supercapacitor device with a remarkable energy density of 29.87 Wh kg^{-1}, wide working voltage windows of 1.6 V and good cycling stability (63.5% retention after 10 000 cycles) is achieved by using the GNRA as an anode and the Ni-Co LDHs@GNRAs as a cathode.

文章链接地址： https://iopscience.iop.org/article/10.1088/1361-6528/ab57ae