High-performance asymmetric supercapacitor based on vanadium dioxide/activated expanded graphite composite and carbon-vanadium oxynitride nanostructures

Ndeye M. Ndiaye [a], Ndeye F. Sylla [a], Balla D. Ngom [b], Farshad Barzegar [c], Damilola Momodu [a], and Ncholu Manyala [a]*

[a] Department of Physics, Institute of Applied Materials, SARChI Chair in Carbon Technology and Materials, University of Pretoria, Pretoria 0028, South Africa.

[b] Laboratoire de photonique Quantique d'Energie et de NanoFabrication, Groupe de Physique du Solide et Science des Matériaux, Département de Physique FST-UCAD BP 5005 Dakar-Fan, Dakar, Sénégal

[c] Electrical, Electronic and Computer Engineering Department, University of Pretoria, Pretoria 0002, South Africa.

*Corresponding author email: ncholu.manyala@up.ac.za, Tel: + (27)12 420 3549;

Fax: + (27)12 420 2516

Supporting Information

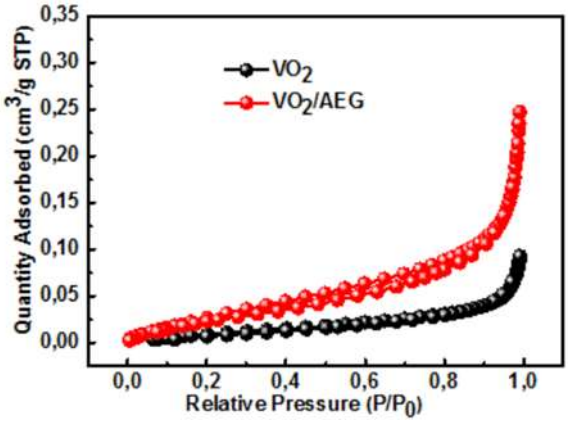

Fig. S1: The N2 absorption/desorption isotherms of VO_2 and VO_2\AEG composite.

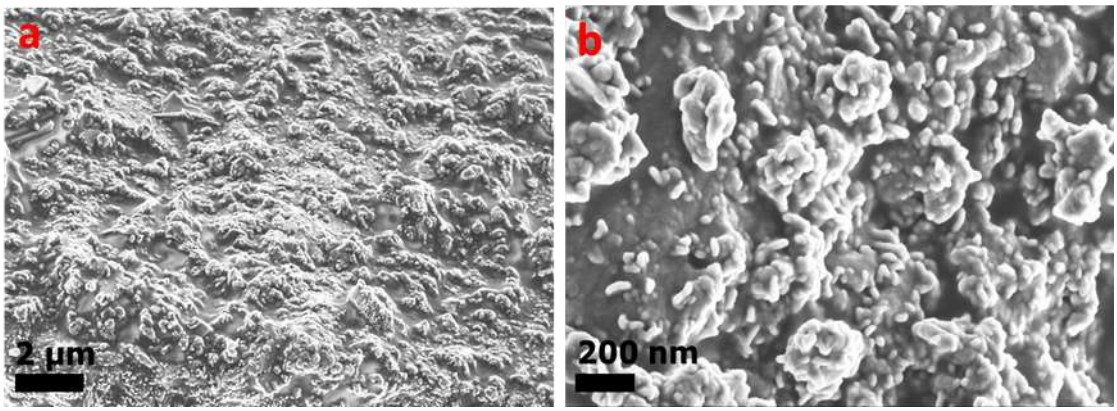

Fig. S2: The SEM image of the vanadium dioxide material at low and high magnification.

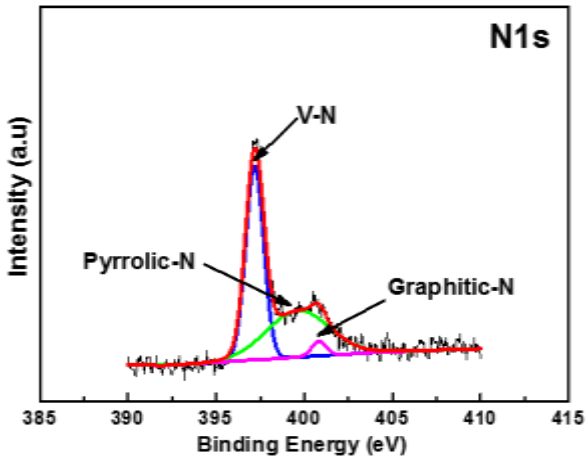

Fig. S3: The N1s binding energy region of the C-V_2NO@800 °C.

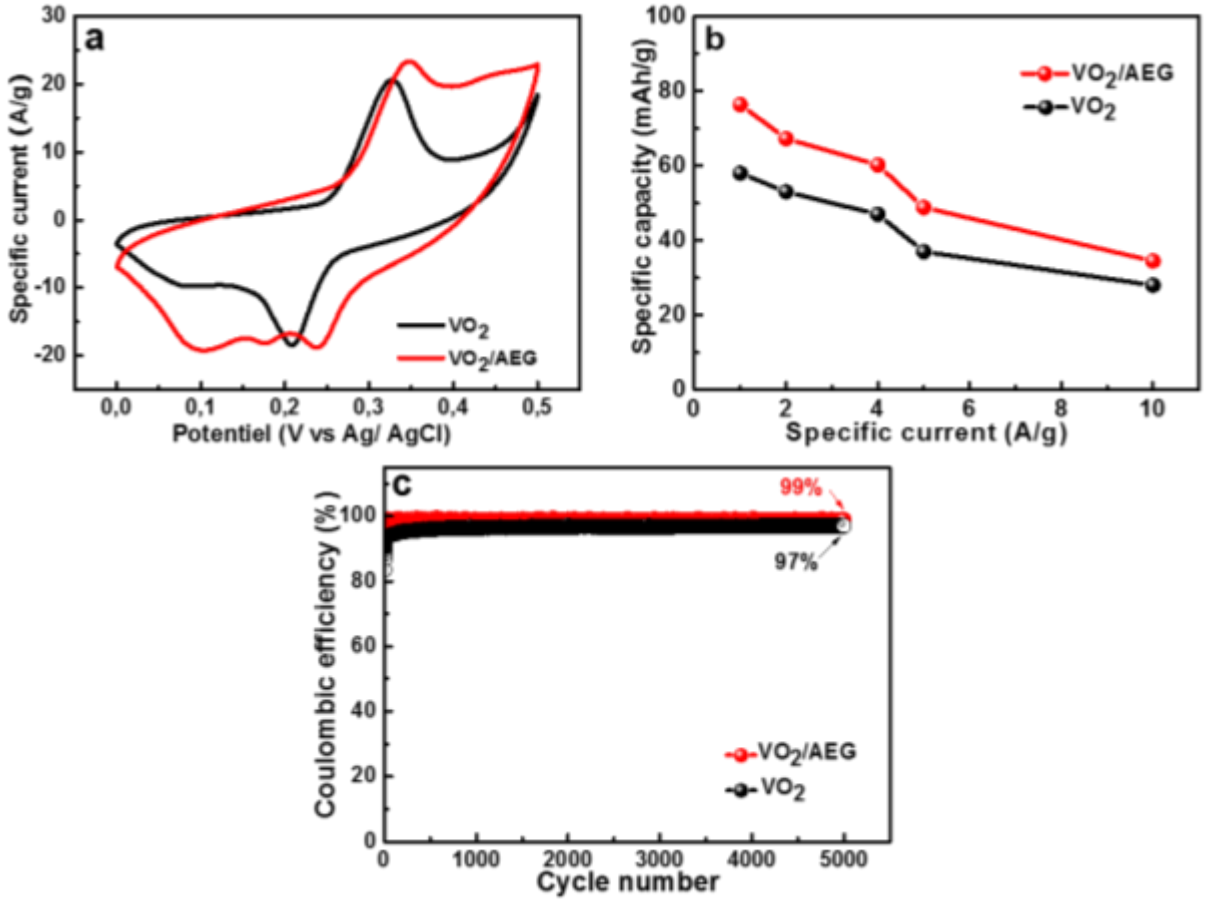

Fig. S4: The comparison of VO_2 and VO_2/AEG composite (a) the CV curves at 20 mV s^{-1}, (b) the specific capacity as a function of the specific current, (c) Coulombic efficiency as a function of the cycle number at a specific current of 10 A g^{-1} VO_2 and VO_2/AEG electrodes.