Supporting information for:

Local Mobility in Electrochemically Inactive Sodium in Hard Carbon Anodes after the First Cycle

Anders C. S. Jensen*\textsuperscript{a,b}, Emilia Olsson\textsuperscript{a,b,c}, Heather At\textsuperscript{b}, Hande Alptekin\textsuperscript{b}, Zhengqiang Yang\textsuperscript{a}, Stephen Cottrell\textsuperscript{d}, Koji Yokoyama\textsuperscript{d}, Qiong Cai\textsuperscript{c}, Maria-Magdalena Titirici\textsuperscript{b} and Alan J. Drew*\textsuperscript{a}

\textsuperscript{a}School of Physics and Astronomy, Queen Mary University of London, Mile End Road, London, E1 4NS, United Kingdom.

\textsuperscript{b}Department of Chemical Engineering, Imperial College London, London, SW7 2AZ, United Kingdom.

\textsuperscript{c}Department of Chemical and Process Engineering, University of Surrey, Guildford, GU2 7XH, United Kingdom.

\textsuperscript{d}ISIS Neutron and Muon source, STFC Rutherford Appleton Laboratory, Chilton, Oxfordshire OX11 0QX, UK.

Figure S1: Arrhenius plot of the jump frequency and temperature for the sodiated(A) and desodiated sample(B).
Figure S2. Calculated sodium intercalation energy for a) one sodium atom in graphitic bilayer model as a function of interlayer distance, and b) as a function of sodium concentration. For b) the interlayer distance was allowed to expand (cell optimisation), with the interlayer spacing recorded on the secondary axis. The red dashed line in a) shows when the Na intercalation becomes energetically favourable (below 0 eV).