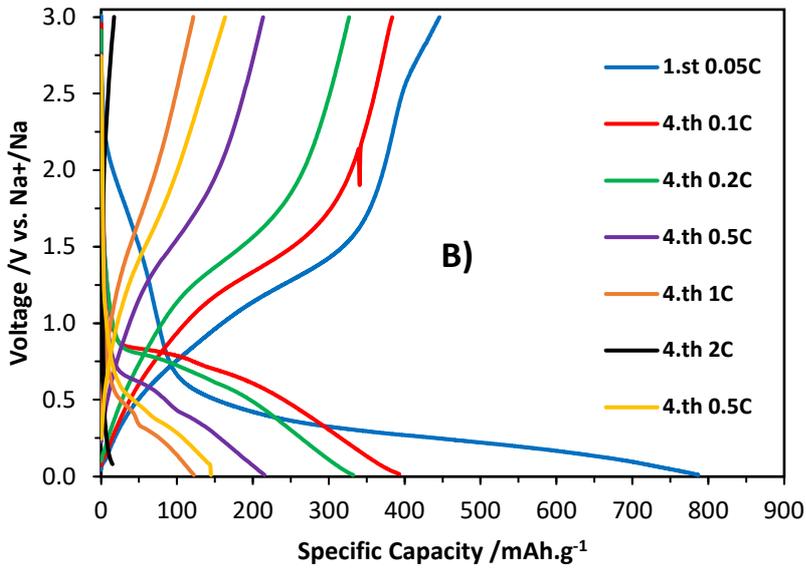
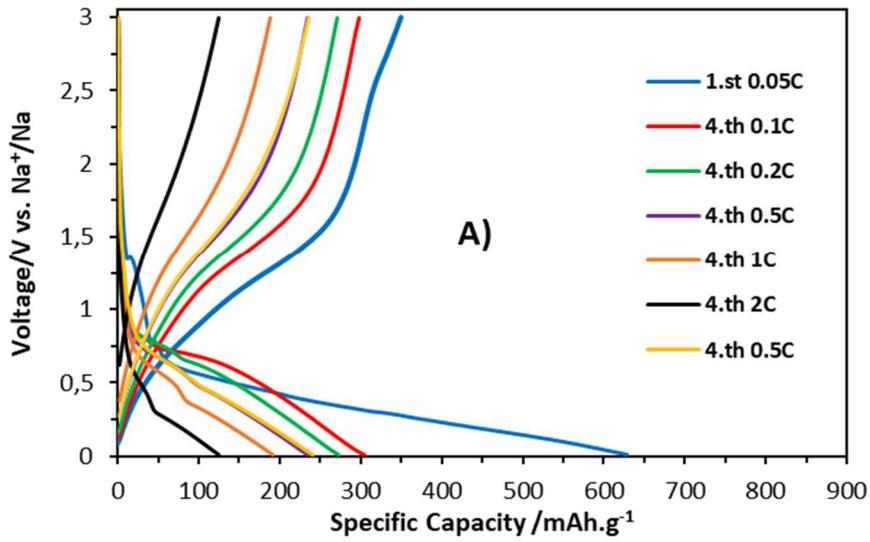


Figure S1 – TG/DSC measurements of (A) GFO-C, (B) GFO-Sn-C and (C) GFO-Mg-C samples.



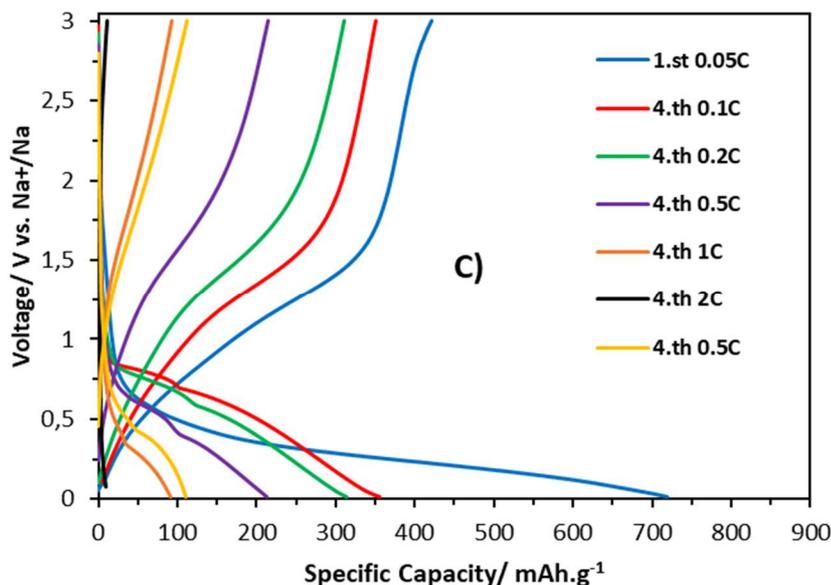


Figure S2 – Voltage profiles of (A) GFO-C, (B) GFO-Sn-C and (C) GFO-Mg-C samples.

As we could expect, the voltage profiles of the samples exhibit a plateau at approximately 0.6 V, due to the irreversible conversion reaction of GeFe_2O_4 into its individual components during the first discharge at $C/20$. For the subsequent fourth cycles two plateau can be detected at $\sim 1,6$ V and $\sim 0,6$ V respectively, corresponding to the reversible redox reactions of Fe and Ge with Na^+ , as confirmed by CV curves (Fig.5). Furthermore, a great slope in the curves is observed by increasing the C-rate, as well as a gradually shift at lower capacity values particularly evident for doped samples. In this regard, it is supposed that the low capacity at 2C rates of Sn-doped samples could be ascribed to the difficulty of this anode to buffer the great volume expansion during sodiation at high current densities, so leading to a breakage of the electrode organic matrix with consequent detachment from the current collector and subsequent loss of capacity.

Regarding Mg- doped sample, after the conversion reaction at low potentials the electrode is composed of Fe, Ge and Mg dispersed in Na_2O matrix. There is a possibility that Mg could solubilize during the anodic scan as Mg^{2+} by binding with the anions of the electrolyte^[40] while after the subsequent cathodic scan it could deposit on the electrode as magnesium metallic. In this regard, we can assume that this process is favored at low currents, while it is severely hindered at high current densities. These hypotheses would explain the poor capacity values by returning to $C/2$, also due to the possible degradation of the electrolyte after Mg dissolution.