Supplementary data

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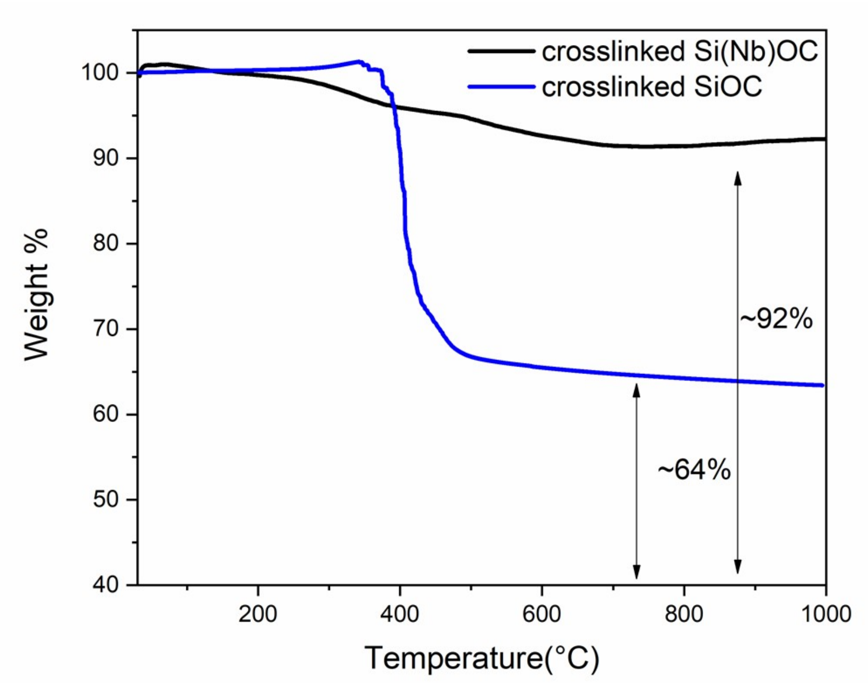

Fig. S1 Thermogravimetric analysis of crosslinked Si(Nb)OC shows Nb modification improves the stability of Si(Nb)OC composites due to suppressed decomposition of Si-O-C bonds

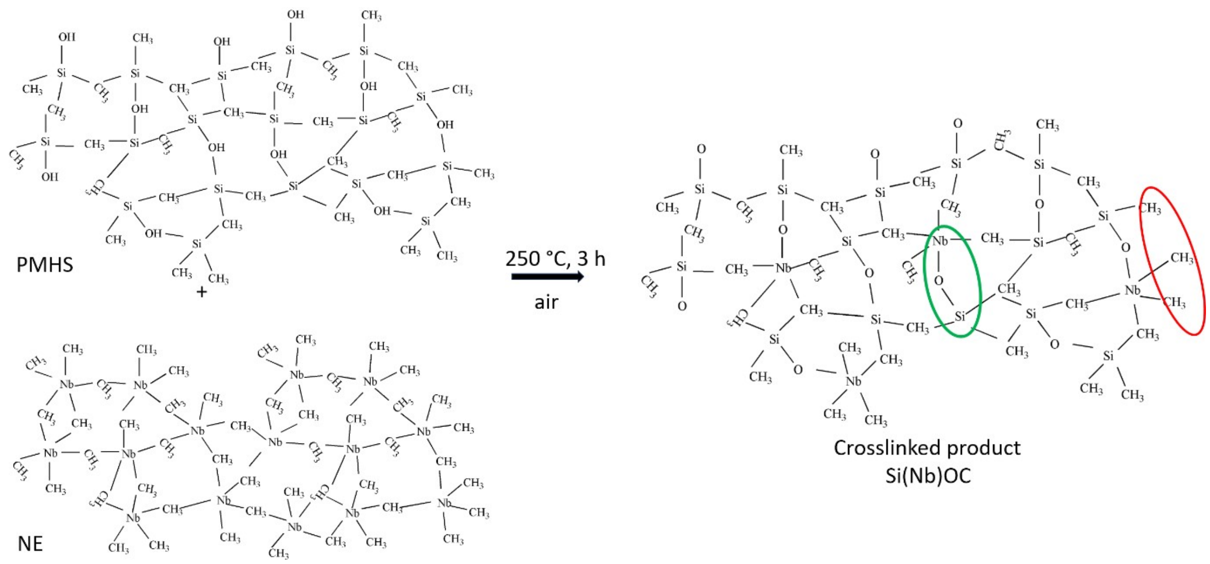

Fig. S2 Chemical structure of initial precursors and crosslinked product of modified PMHS:NE showing Si-O-Nb linkage (green) and methyl groups (red), subsequent heating which leads to produced in situ segregated carbon and amorphous Si(Nb)OC structure.

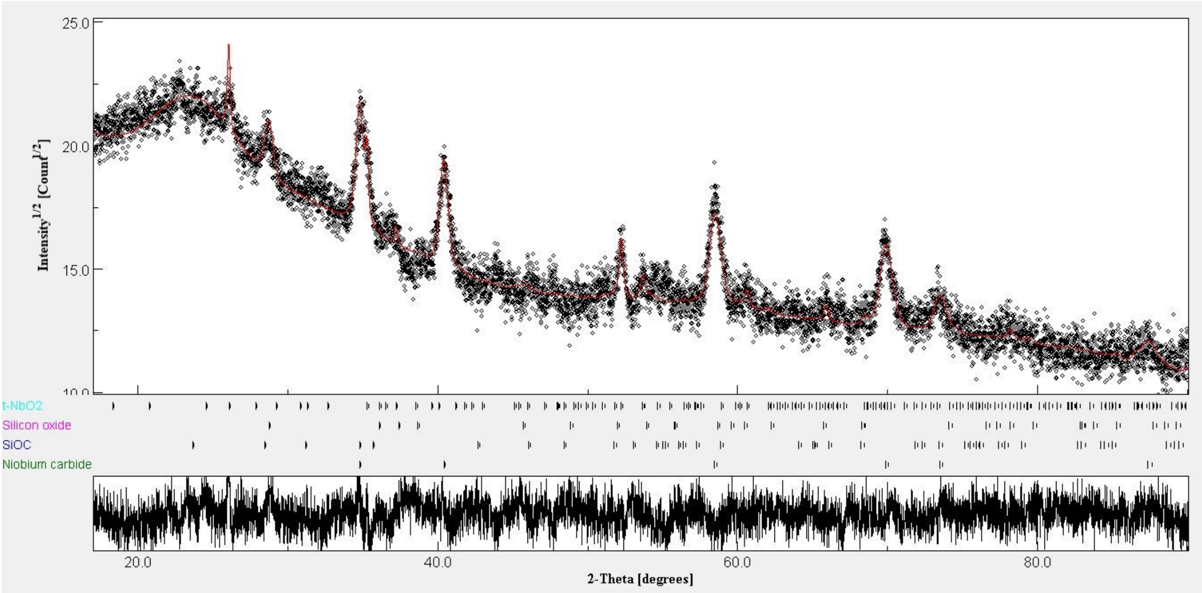

Fig. S3. Rietveld refinement of Si(Nb)OC composites using MAUD software

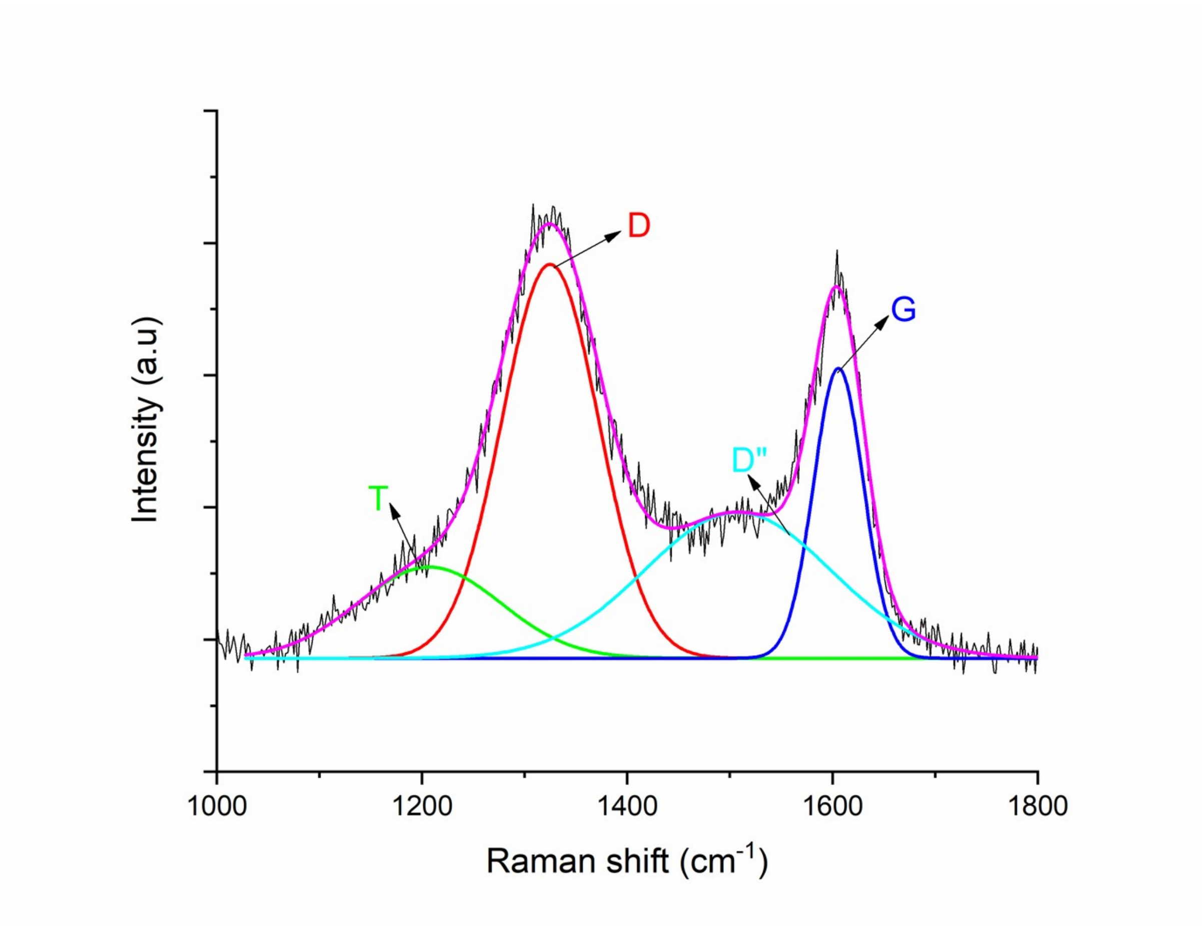

Fig S4. Raman spectrum deconvoluted peaks D and G peaks of annealed Si(Nb)OC.

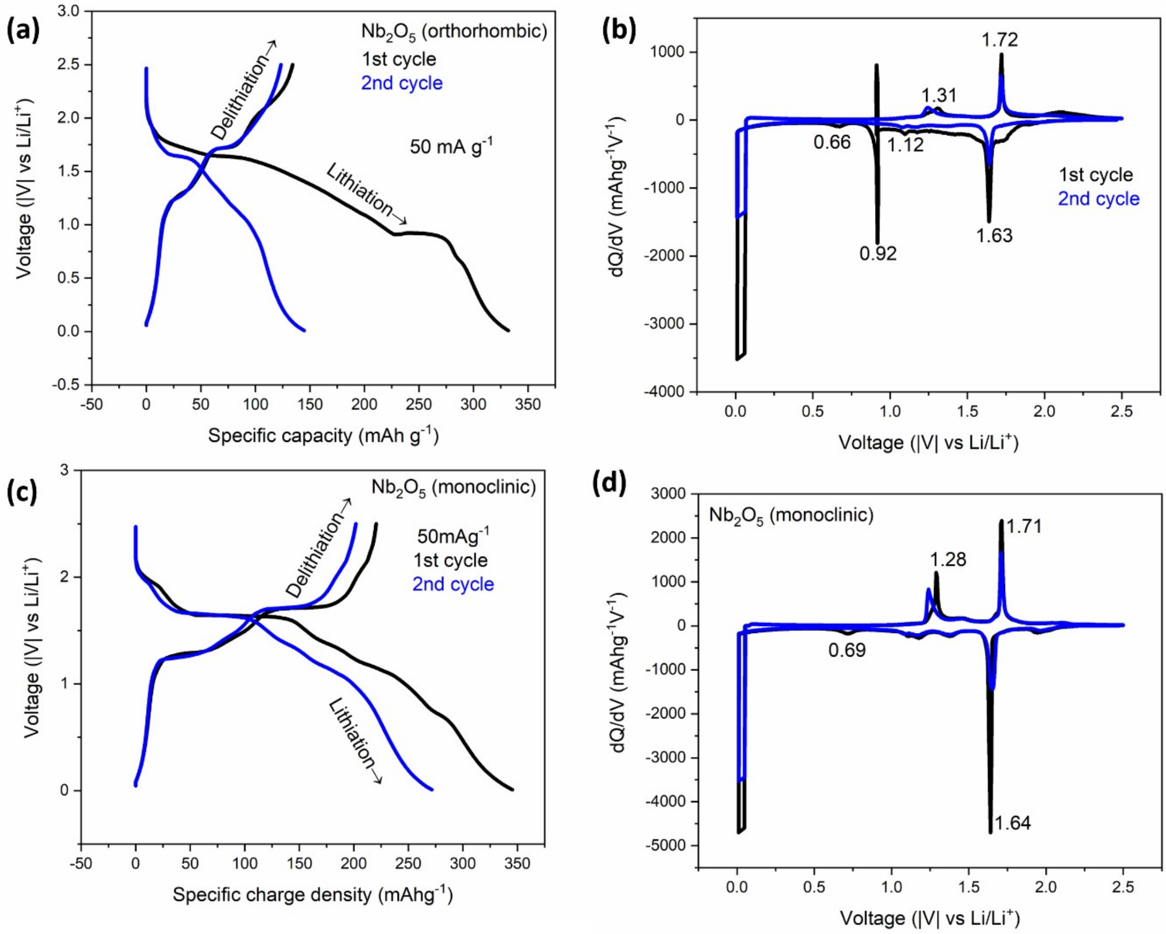

Fig. S5 Charge-discharge curves and respective differentiated capacity curves of pure Nb_2O_5 (a-b) orthorhombic Nb_2O_5 (900 °C) and (c-d) monoclinic Nb_2O_5 (1200 °C)

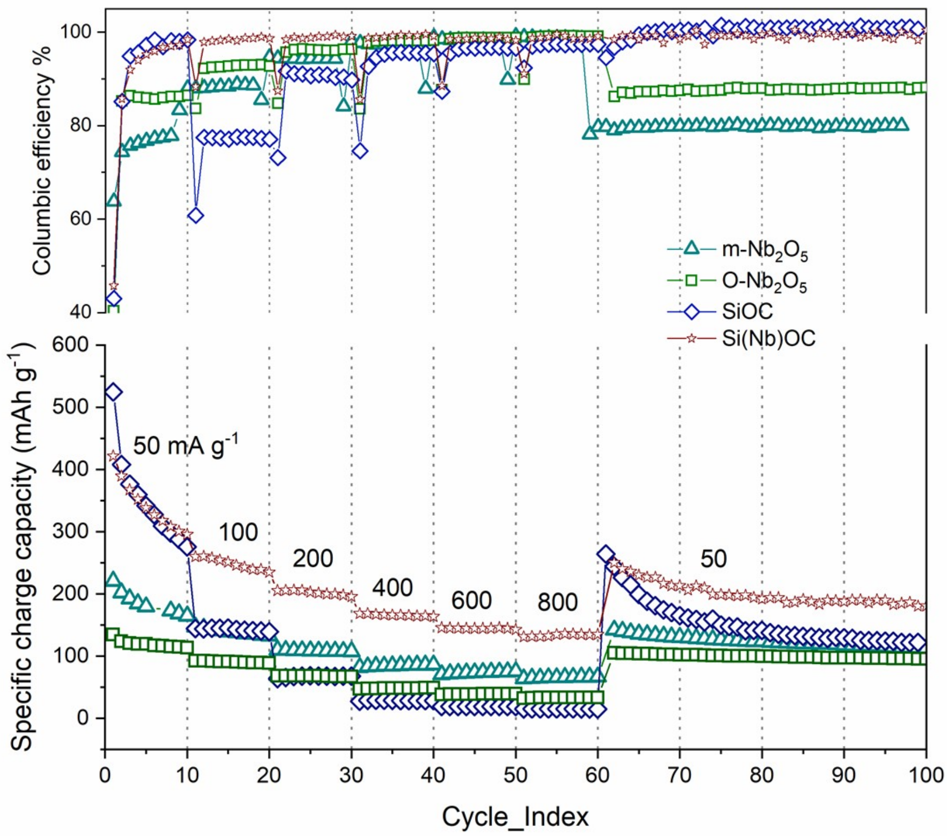

Fig. S6 Cyclic stability of pure Nb_2O_5 and as-pyrolyzed Si(Nb)OC composite anodes when cycled asymmetrically at increasing current densities and their respective columbic efficiency