Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information:

Conductivity of Cold Sintered Diphasic Composites Containing a Ceramic Active Material and a Solid-State Electrolyte or Carbon for All Solid-State Batteries

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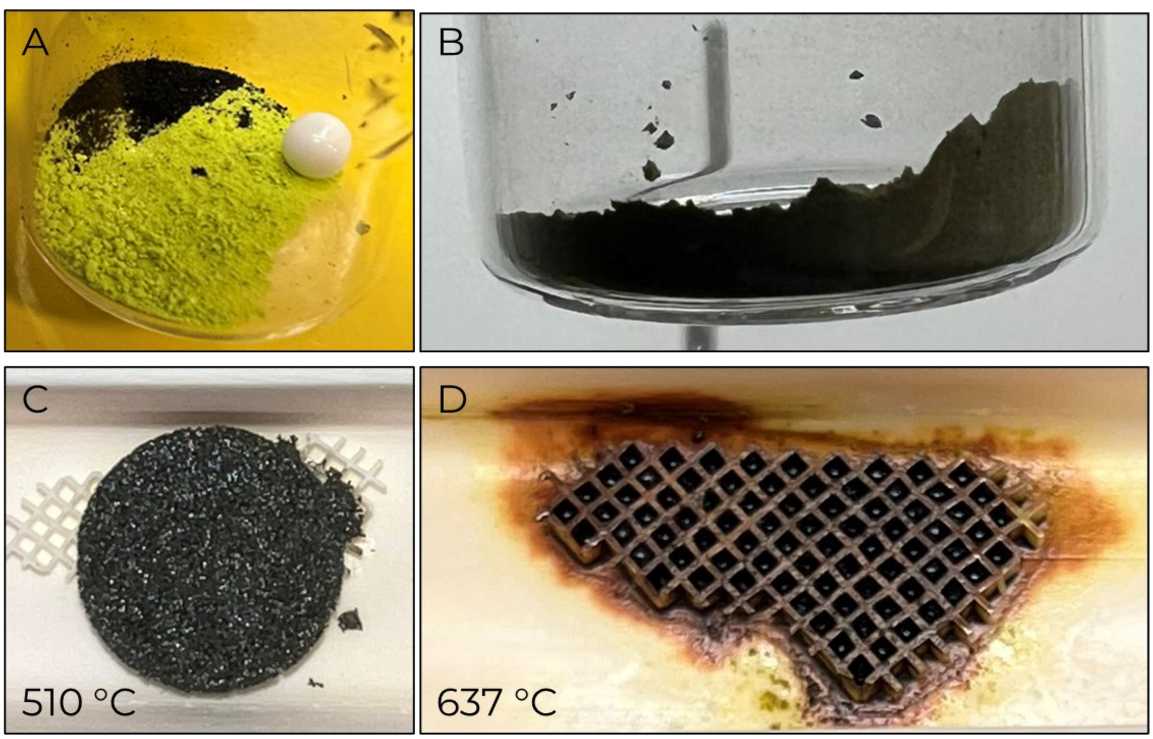

Figure S1 *NVP and carbon prior to mixing (A). NVP and carbon after mixing (B). NVP and carbon pellet after being heated to 510 °C under air (C). NVP and carbon after being heated to 637°C under air (D).*

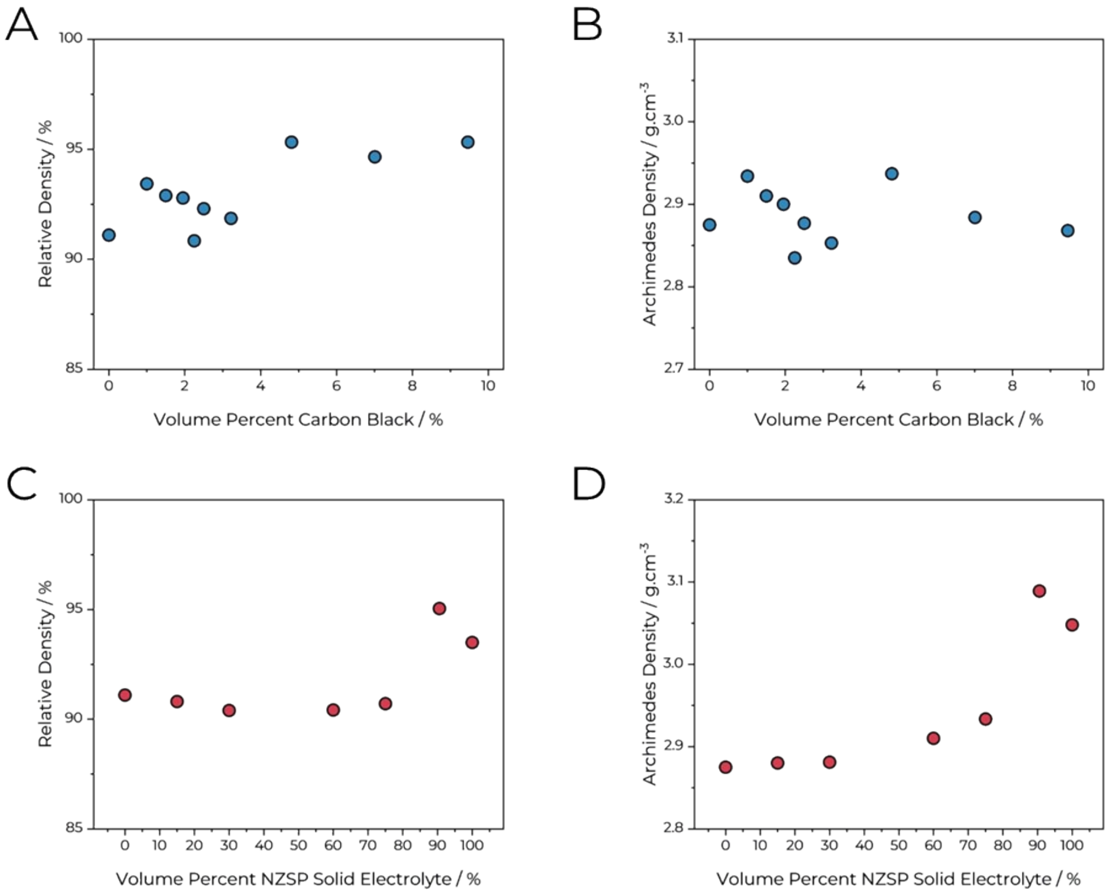

Figure S2 *The relative density (****A****) and Archimedes density (****B****) of carbon black – NVP composites. The relative density (****C****) and Archimedes density (****D****) of NZSP – NVP composites. Theoretical densities calculated based on volume fraction of composite and material densities (NVP = 3.16, NZSP = 3.26, carbon black = 1.6 g.cm^{-3})*

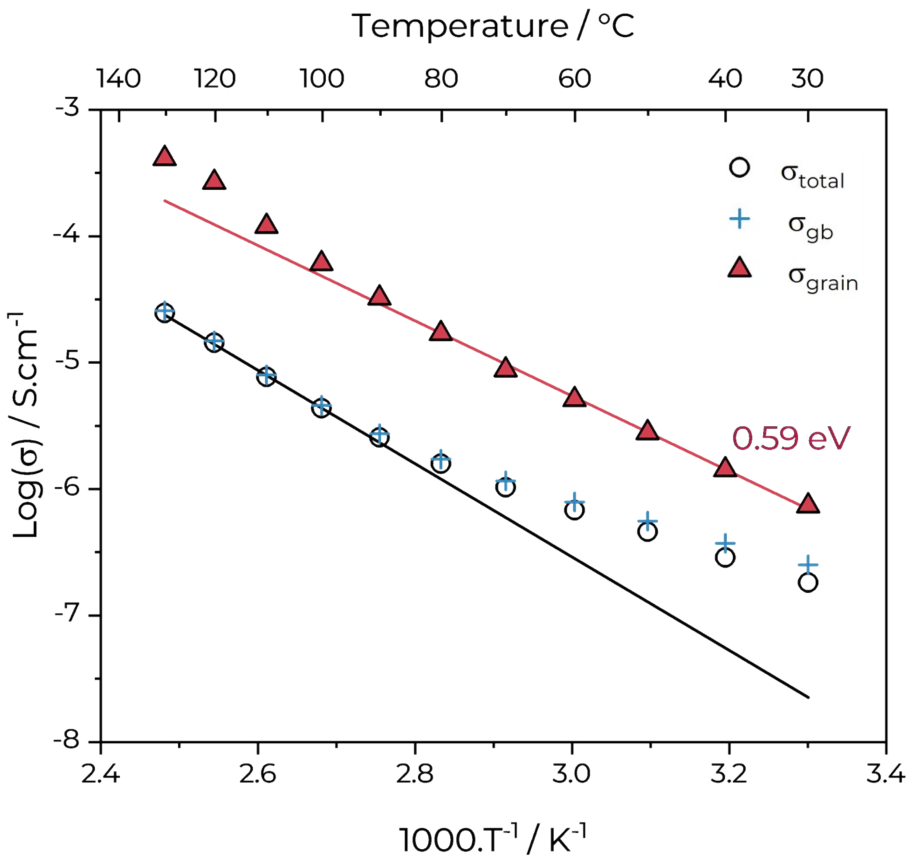

Figure S3 *The logarithm of total, grain boundary (gb), and grain interior (grain) conductivity plotted against inverse absolute temperature for the pure cold sintered NVP.*

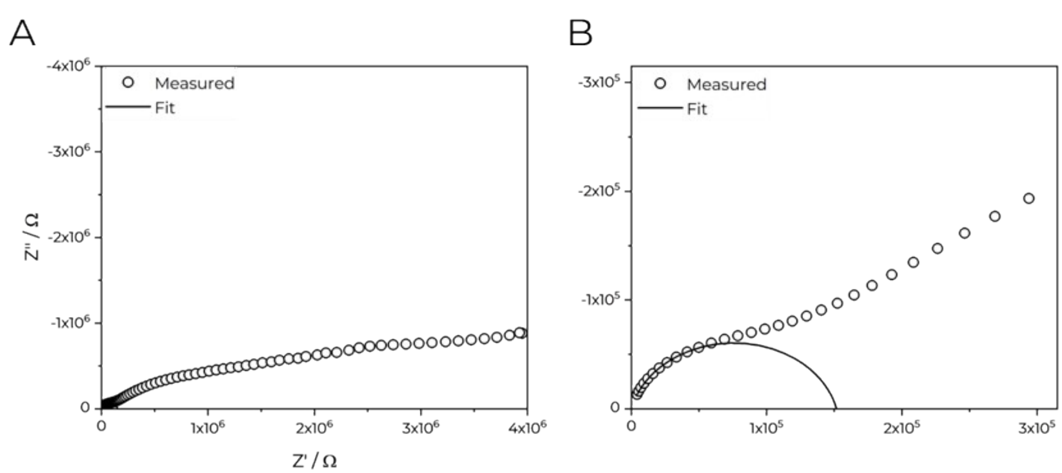

Figure S4 *Complex impedance spectra of a sample containing 2.25 vol.% carbon black. The dispersion in the low frequency data renders it difficult to fit (A), but R_{tot} can be estimated from the well-resolved high frequency semicircle, as shown in (B)*

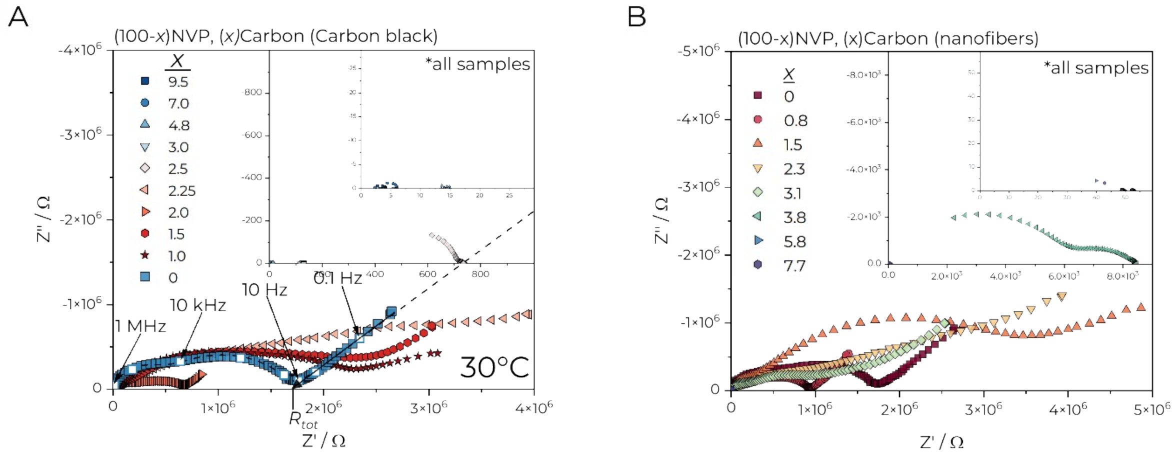

Figure S5 *The EIS spectra of all carbon-NVP composites at 30°C. The data for Super P is shown in* ***A*** *and that for carbon nanofibers is shown in* ***B.***

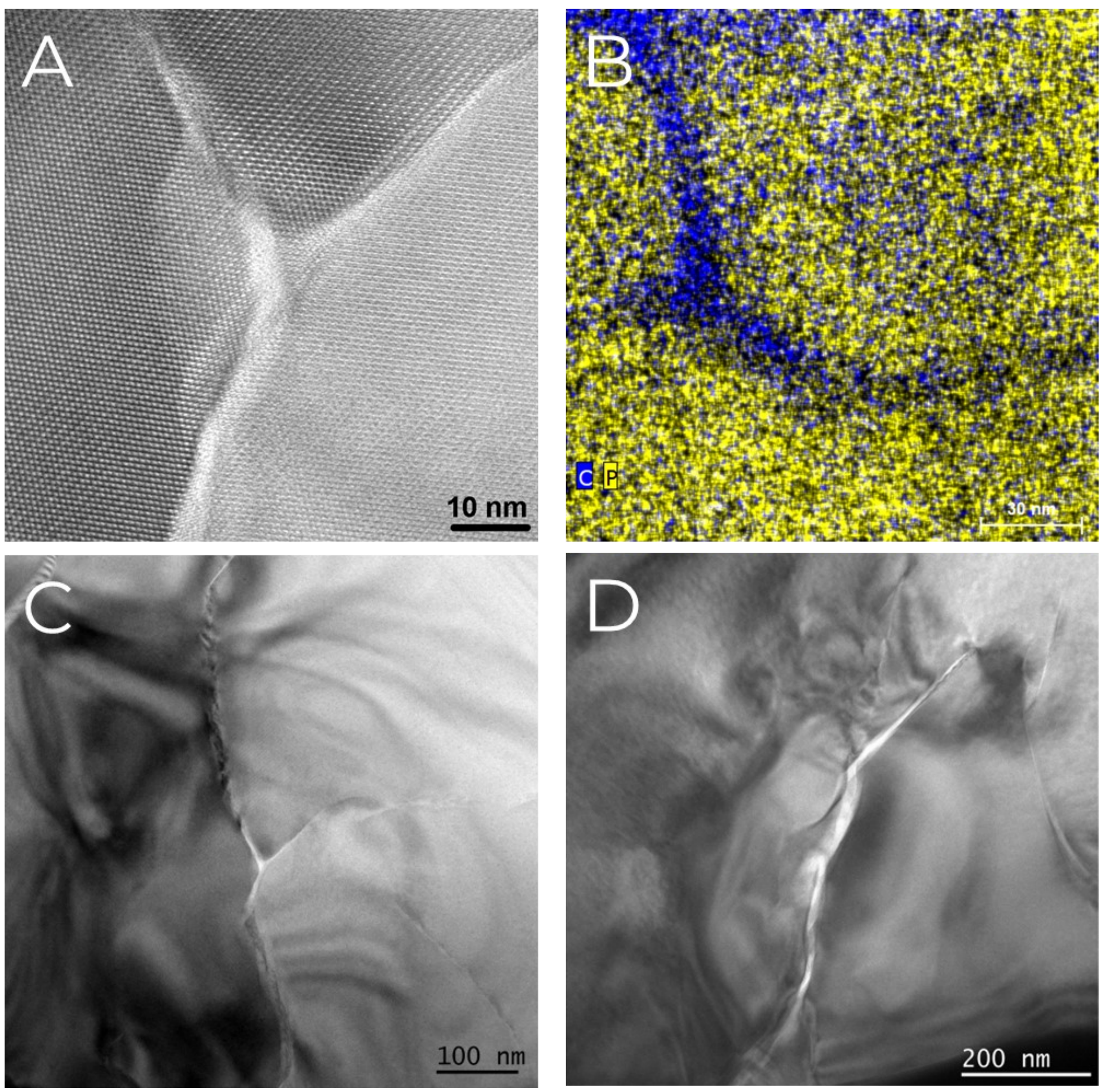

Figure S6 *Additional TEM images demonstrating carbon presence in the grain boundaries of a carbon black – NVP diphasic composite.*

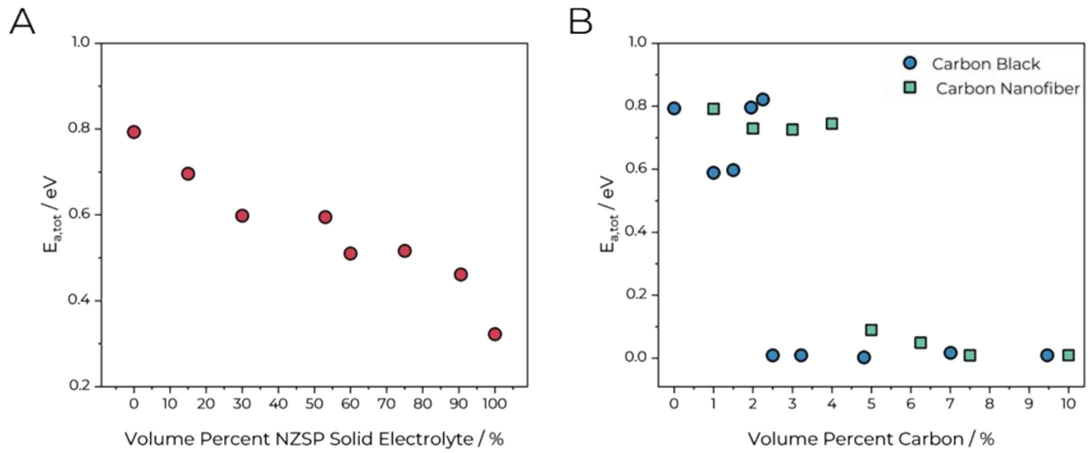

Figure S7 *$E_{a,tot}$ is plotted as a function of volume fraction of NZSP (A) or carbon (B)*

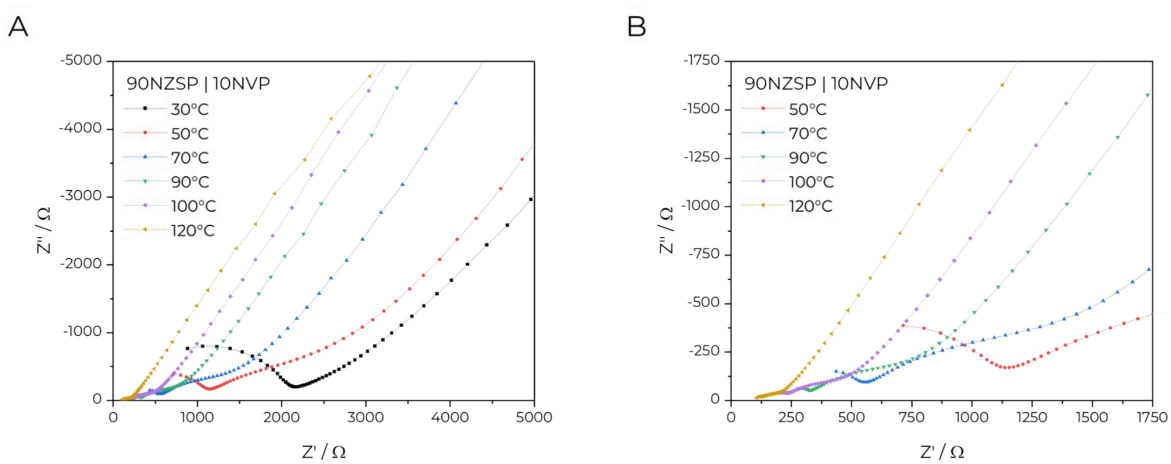

Figure S8 *The EIS spectra of a 90 vol.% NZSP sample used for Mott-Schottky experiments. Multiple temperatures are shown to illustrate the reason for choosing 70°C. The high frequency semicircle is the NZSP response, the intermediate frequency semicircle is the interfacial response. The lines are only meant as a guide to the eye, not an equivalent circuit fitting.*