Supplementary information - Molecularly imprinted polymer nanoparticle-carbon nanotube composite electrochemical gas sensor for highly selective and sensitive detection of methanol vapour

1. Raw data from selected studies with methanol vapour

Cyclic voltammograms from data at 2 mmol dm^{-3}, 1 mmol dm^{-3}, and 100 µmol dm^{-3} are given below. At higher concentrations (Figure S1) the voltammogram shows a response typical for cyclic voltammetry. As the concentration is decreased (Figure S2) the peak is reduced, and a simple plateau is observed in which the current of the plateau is proportional to the concentration. As the concentration is reduced further (Figure S3) the redox potential moving increasingly to lower voltage. The result is a constant current (within the observed potential range) proportional to the analyte concentration. The cyclic voltammogram for the five highest recorded current measurements are given for each concentration.

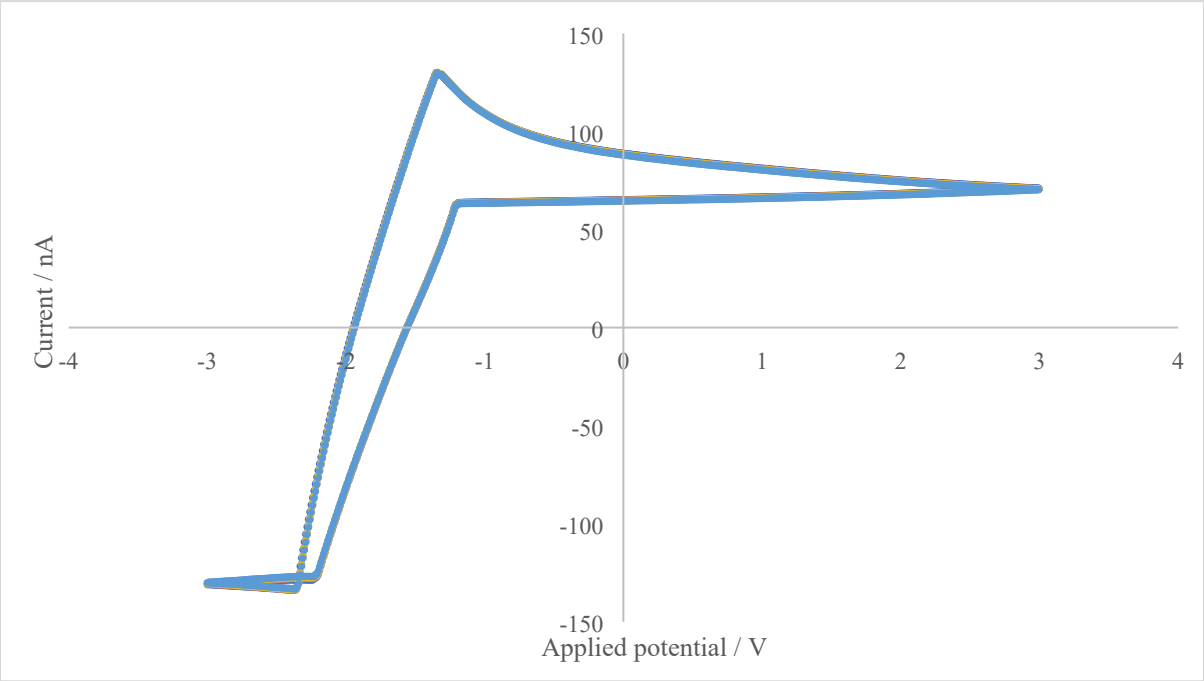

Figure S1: overlay of cyclic voltammograms recorded at 2 mmol dm^{-3} methanol vapour. The response is typical for cyclic voltammetry.

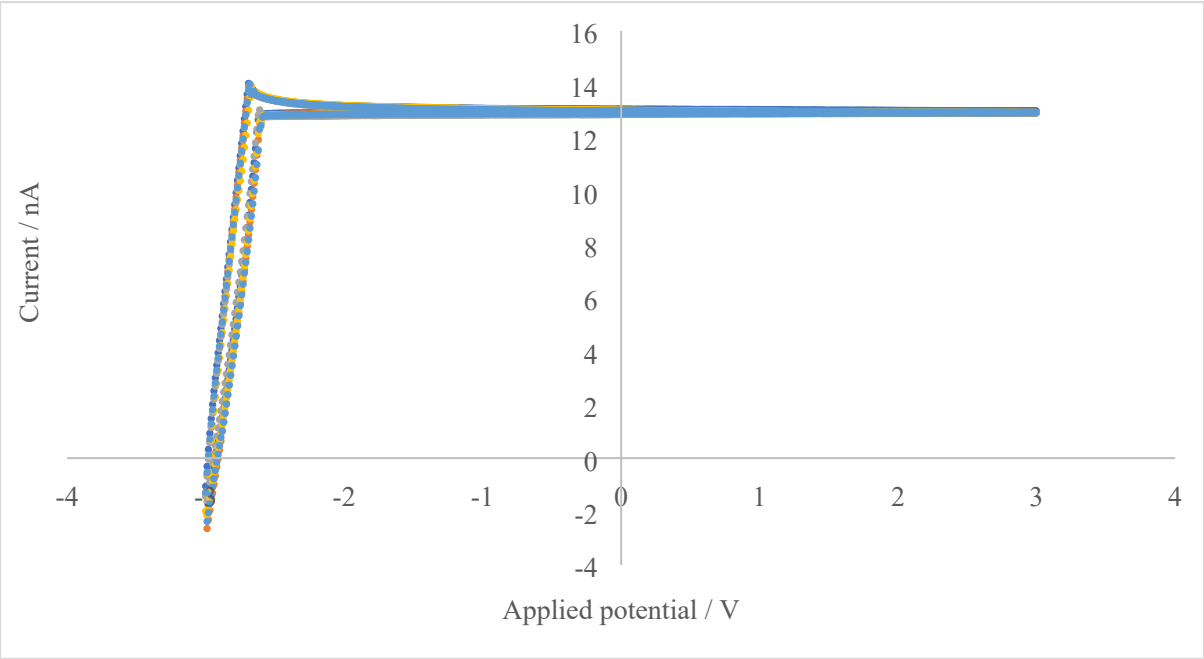

Figure S2: Cyclic voltammograms at 1 mmol dm^{-3} methanol vapour. The distinction between the forward and backward sweep is reduced at lower concentrations. The peak occurs at a lower potential

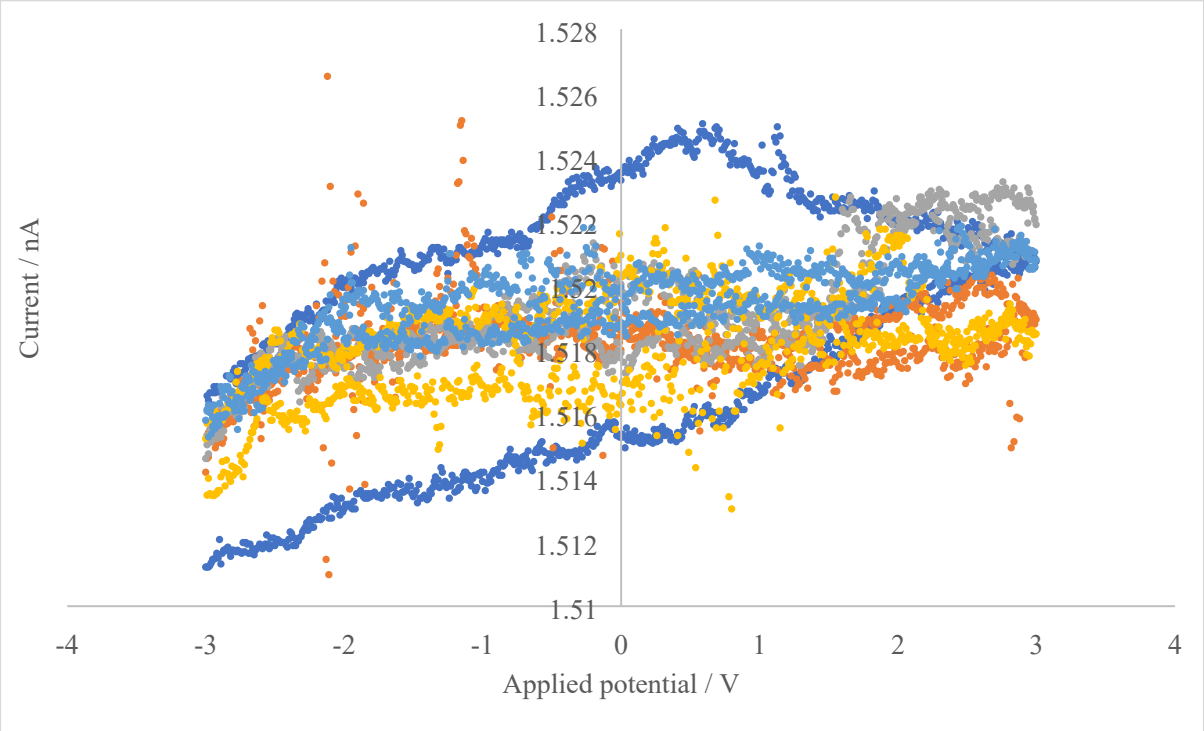

Figure S3: Cyclic voltammograms at 100 µmol dm^{-3} methanol vapour. The peak is no longer visible in the applied potential range, and the response appears as a level plateau.

2. Raw data from studies with non-imprinted polymer-carbon nanotube equivalents

Following the successful demonstration of methanol sensing with molecularly imprinted polymer nanoparticles, a series of electrodes were prepared using non-imprinted polymer nanoparticle equivalent materials. The synthesis of these devices was identical with the exception that no template (methanol) was added during the synthesis. The raw data obtained using the non-imprinted devices at 3 different concentrations is given below. In each case the 5 highest current measurements are overlayed. Little variation is observed from varying the concentration, resulting in a current of approximately 1 nA in response to 1.0, 1.5, and 2.0 mmol dm^{-3}.

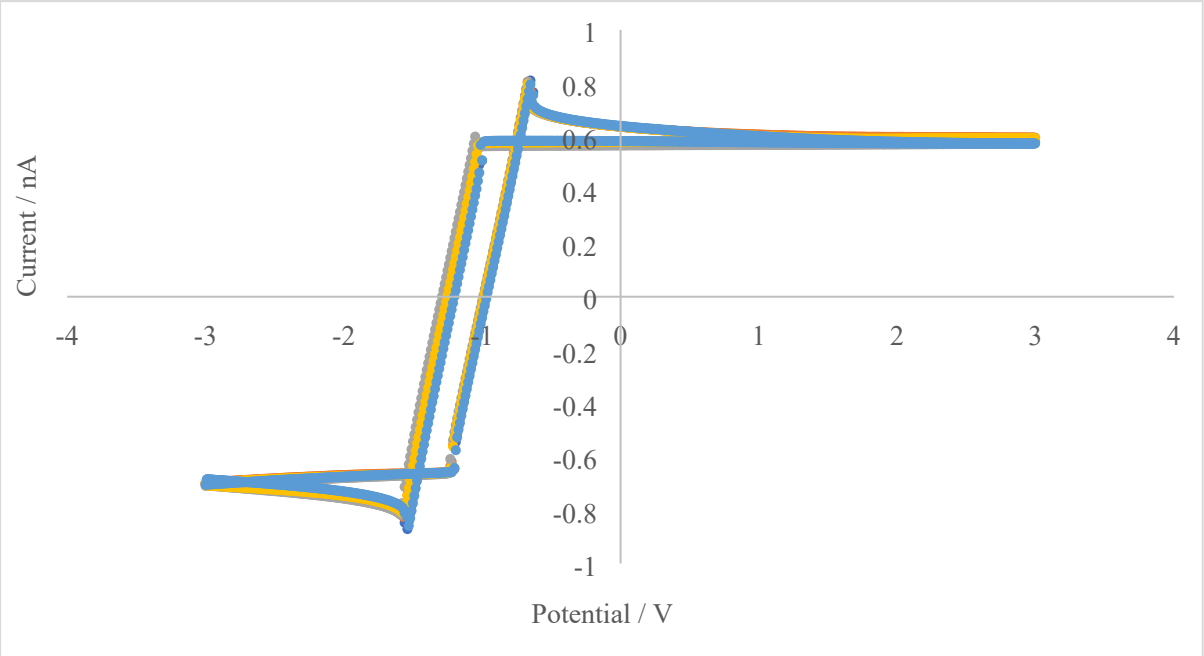

Figure S4: cyclic voltammograms in response to 2.0 mmol dm^{-3} methanol vapour using the non-imprinted device.

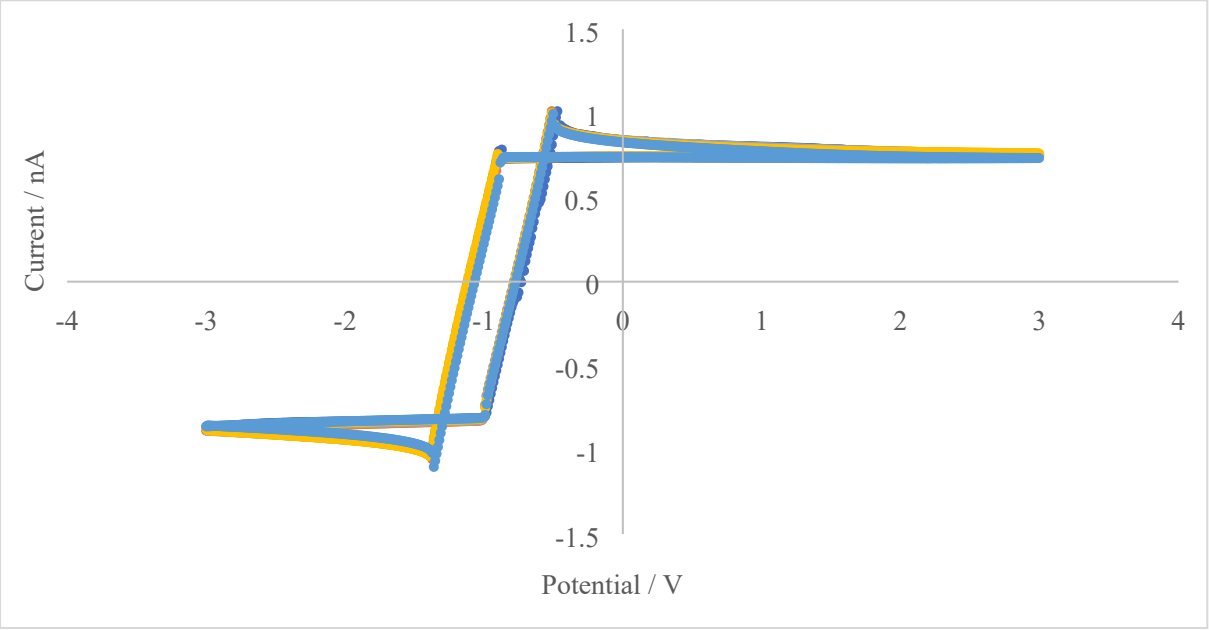

Figure S5: cyclic voltammograms in response to 1.5 mmol dm^{-3} methanol vapour using the non-imprinted device.

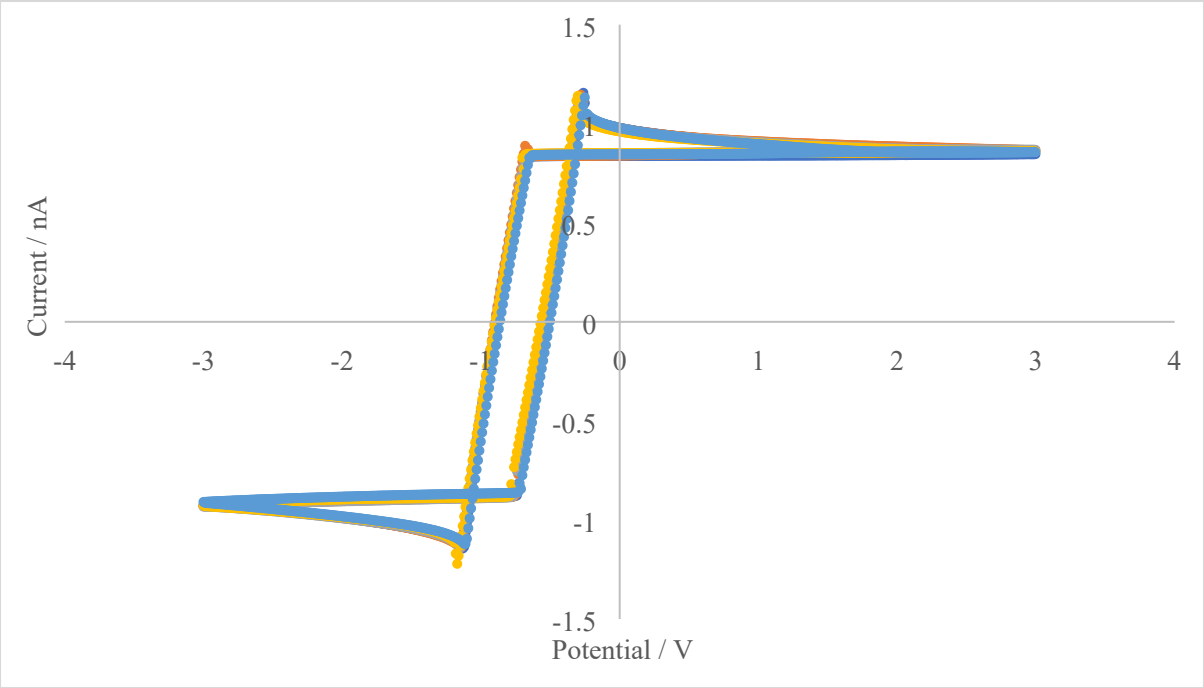

Figure S6: cyclic voltammograms in response to 1.0 mmol dm^{-3} methanol vapour using the non-imprinted device.