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

A fuel cell catalyst support based on doped titanium suboxides with enhanced conductivity, durability and fuel cell performance

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Supporting Information

Commercial Pt/C catalyst

Figure S1 shows the X-ray diffraction pattern obtained for the commercial Pt/C catalyst used in this study (Johnson Matthey HiSpec 3000). Also shown in Figure S1 are TEM images obtained for the same catalyst. The average Pt crystallites sizes was calculated from the XRD pattern from the broadening of the [220] and [222] peaks using the Scherrer-Debye equation, and yielded a mean crystallite size 3 nm. This is consistent with the reported particle size distribution of Pt for this catalyst [1].

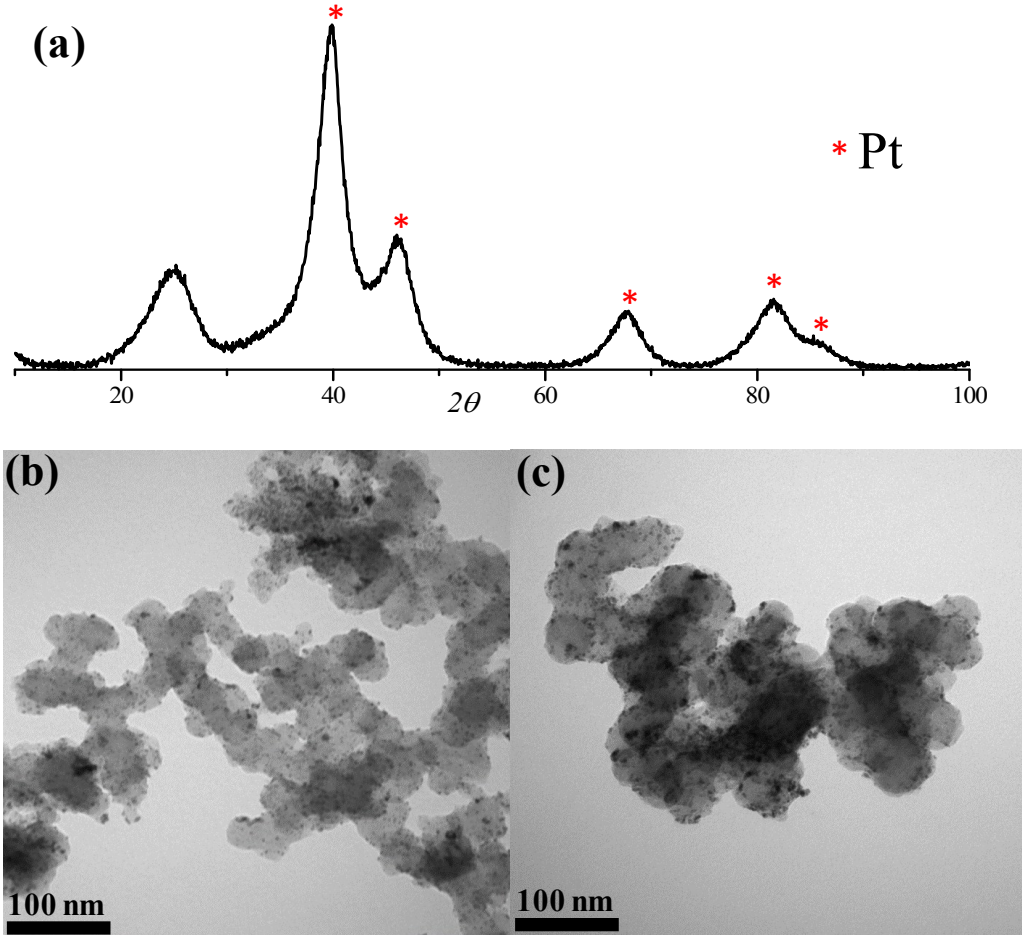

Figure S1: (a) X-ray diffraction pattern obtained for Pt/C. (b) and (c) TEM images corresponding to Pt/C electrocatalyst.

SEM with EDX mapping before and after AST

SEM analysis with EDX composition mapping was performed on both Pt/TOMS and Pt/C electrocatalysts before and after they were subjected to accelerated stress testing (AST); these images are shown in Figure S2. The Pt/TOMS catalyst layer morphology remained stable over the course the AST. Furthermore, EDX mapping indicates there was essentially no change in the elemental distribution of the Pt/TOMS catalyst layer components after the AST. This indicates that the TOMS support structure remained stable and large-scale migration of Pt particles was mitigated.

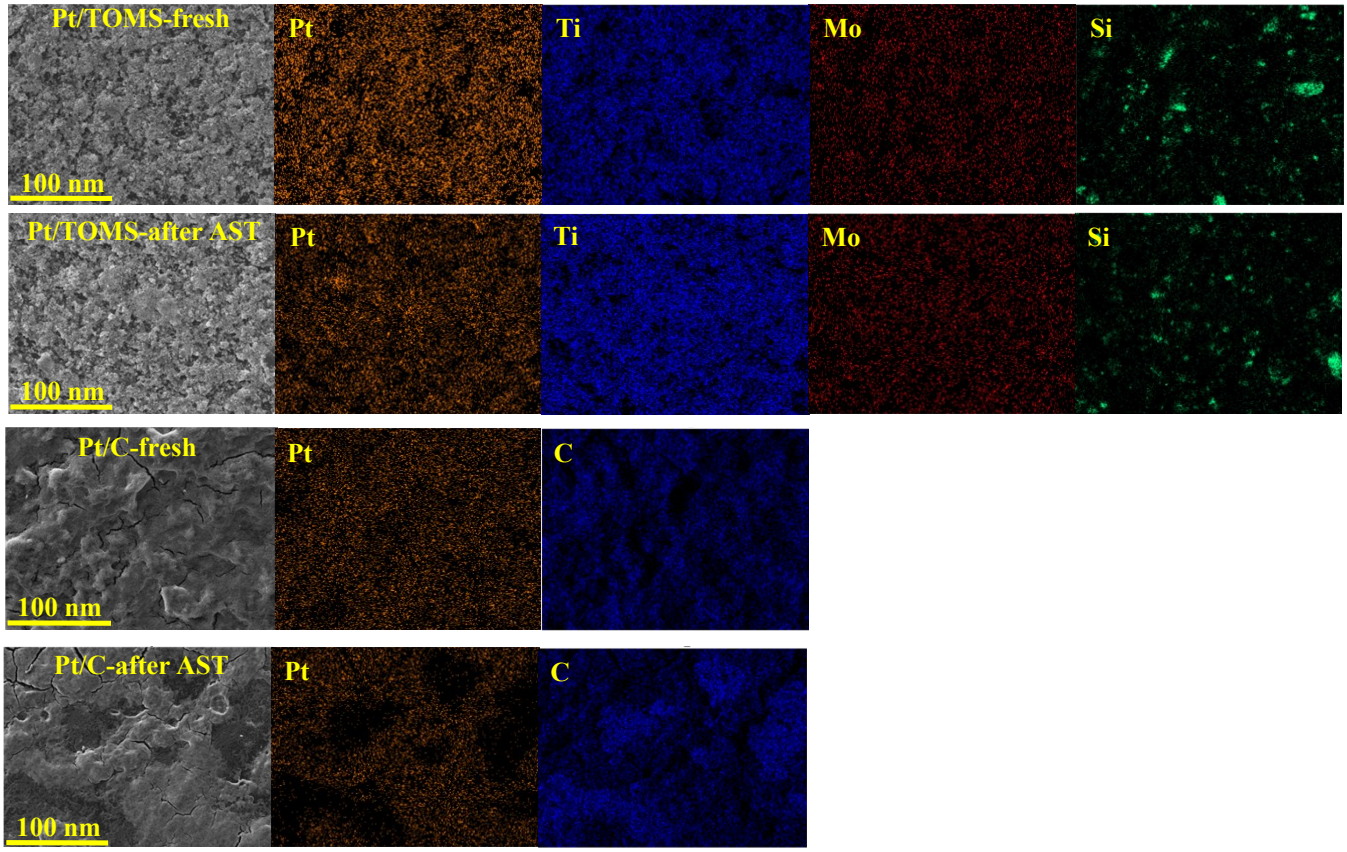

Figure S2: SEM with EDX elemental mapping obtained for the Pt/TOMS and Pt/C electrocatalysts before and after AST.

References

1. F. S. Saleh and E. B. Easton, *Journal of Power Sources*, 2014, **246**, 392-401.