Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supporting Information

Titanium Nitride Nanoparticles Based Electrocatalysts For Proton Exchange Membrane Fuel Cells

XRD Data of TiN

*TiN (JCPDS # 38 – 1420) Lattice Parameter a: 4.241Å
*TiO (JCPDS # 77 – 2170) Lattice Parameter a: 4.185Å

From XRD, Lattice parameter of TiN sample is 4.220Å and lies between lattice parameters of TiO & TiN

$$TiO\ (4.185\ Å) < 4.22\ Å < TiN\ (4.241Å)$$

which implies the existence of a (TiNxO1-x) layer on the surface of TiN.

Ref: X.Yang et al. / Chemical Physics Letters 383 (2004) 502-506.

XPS of TiN

As can be seen from the XPS graph in Figure S1, before sputtering, the TiO_2 peaks are dominating indicating the presence of oxide layer on the surface of TiN. After etching of the surface, the TiN peak appears with a simultaneous reduction of TiO_2 peak thus indicating the presence of oxygen rich layer on the surface of TiN.

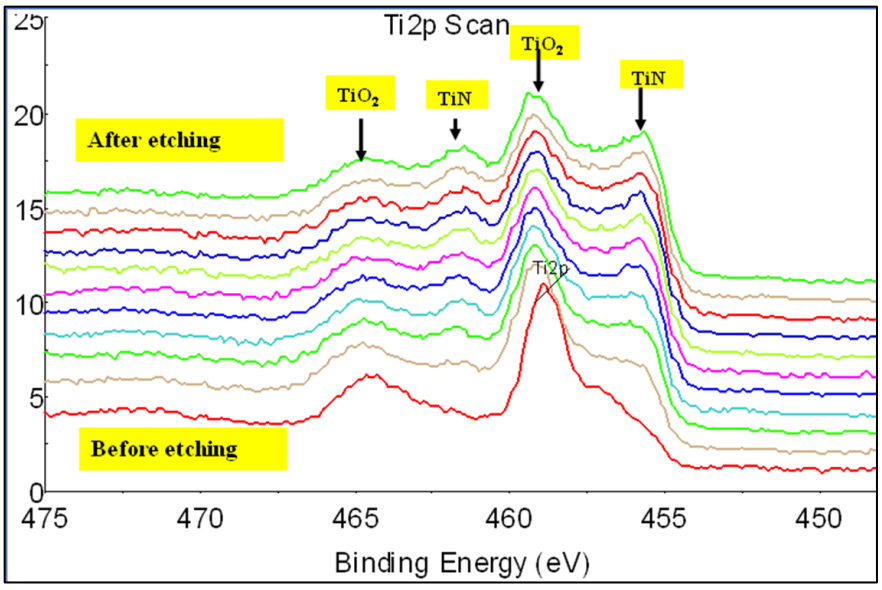

Figure S1: XPS of TiN (Ti2p scan) before and after Ar^+ sputtering for 150s at 0.1nm/s

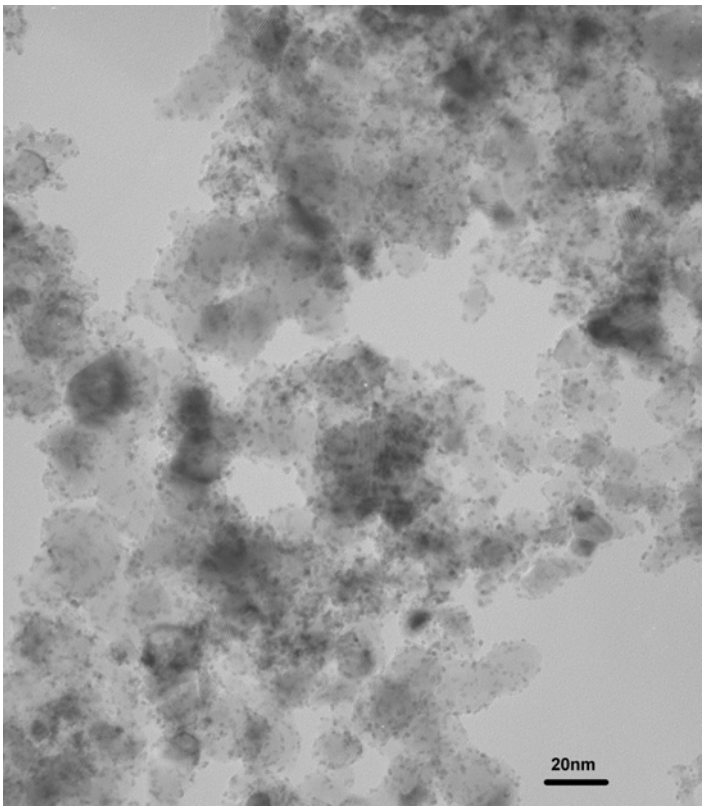

Figure S2. TEM micrograph of Pt/TiN prepared using polyol process

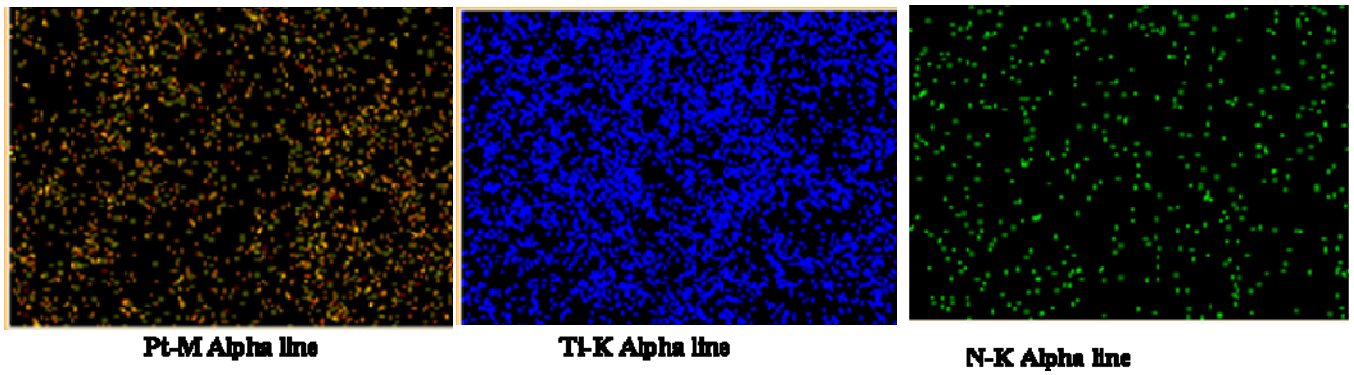

Figure S3. X-Ray Mapping of Pt/TiN shows uniform distribution of Pt and TiN

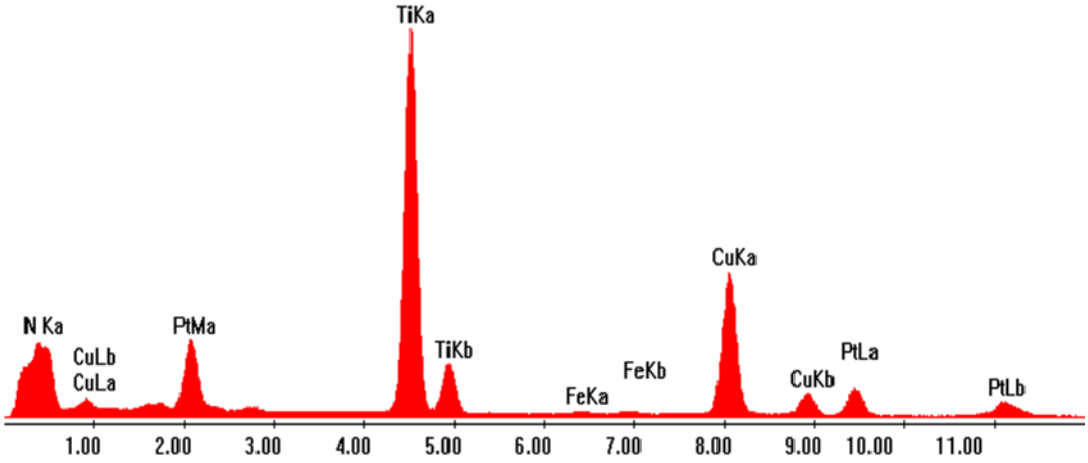

Figure S4. Energy Dispersive Spectra (EDS) High Resolution TEM based EDS of Pt/TiN on a copper grid. The peaks of Cu and Fe are from the Cu grid used while taking TEM images.