Electronic Supplementary Material (ESI) for CrystEngComm.

Supplementary Information

Nanotube-shaped PtFe intermetallics: Control synthesis, crystal structure and their improved electrocatalytic activities

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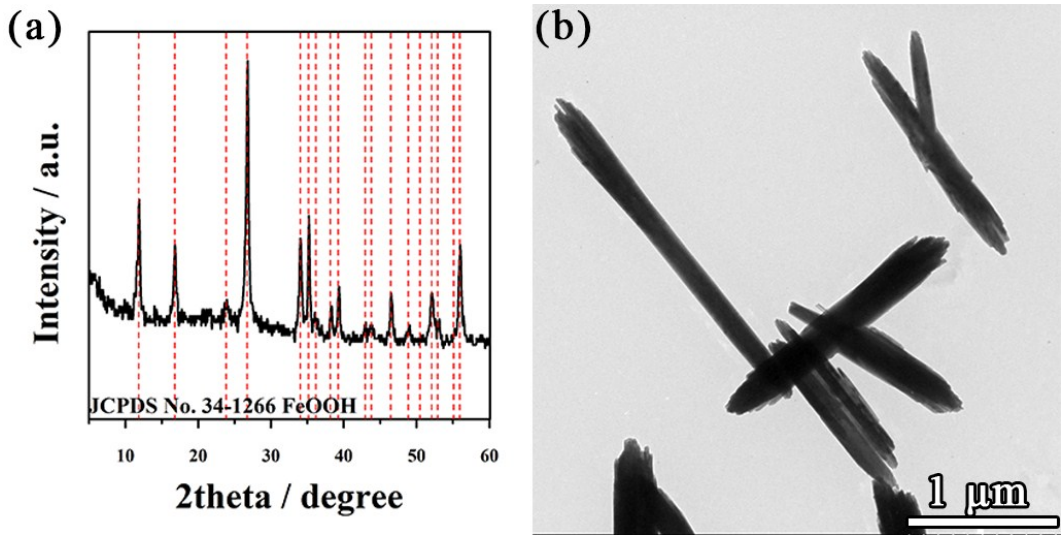


Fig. S1 (a) XRD pattern and (b) TEM image of FeOOH nanorod.

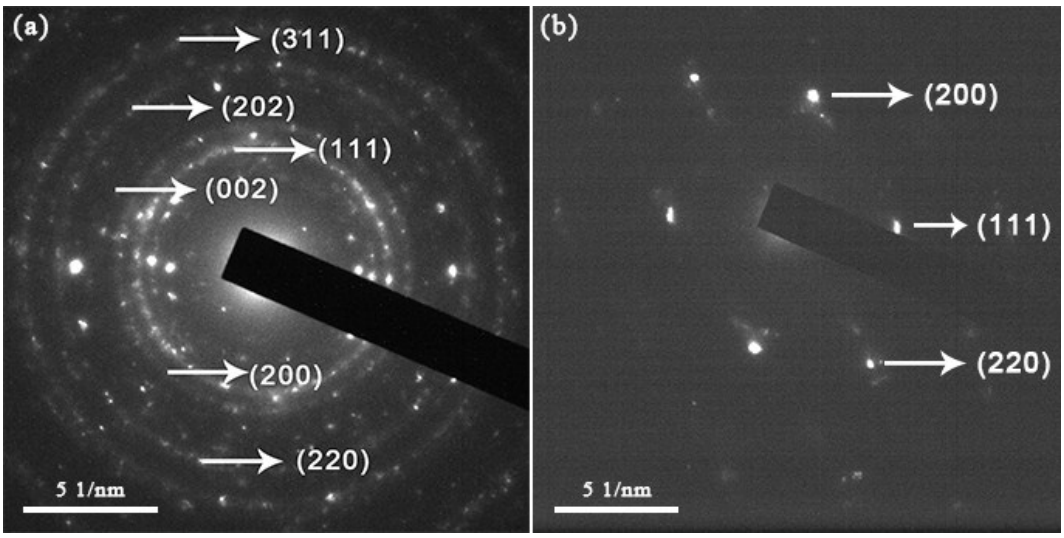


Fig. S2 Selected area electron diffraction patterns of the PtFe intermetallic nanotube of (a) as a whole and (b) a single PtFe intermetallic nanoparticle sitting on the surface of the tube.

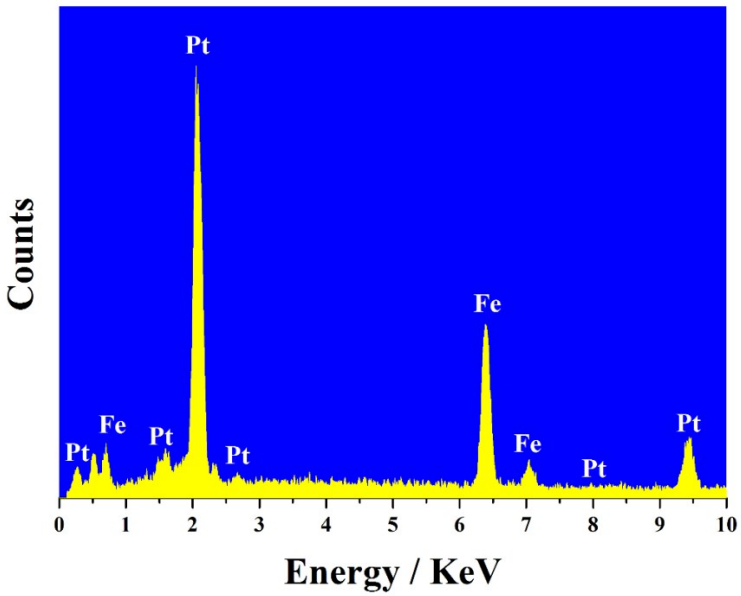


Fig. S3 EDX spectrum of order PtFe intermetallic nanotube.

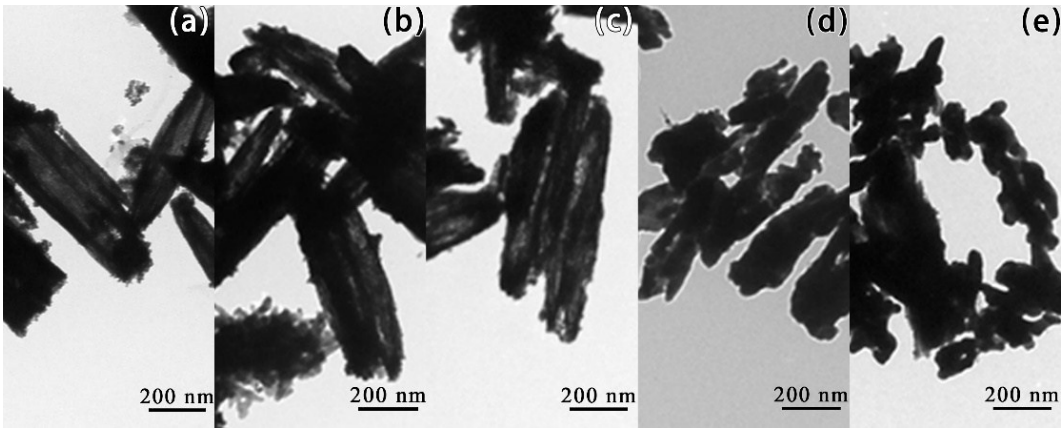


Fig. S4 TEM images of (a) PtFe-300, (b) PtFe-400, (c) PtFe-500, (d) PtFe-600, (e) PtFe-700.

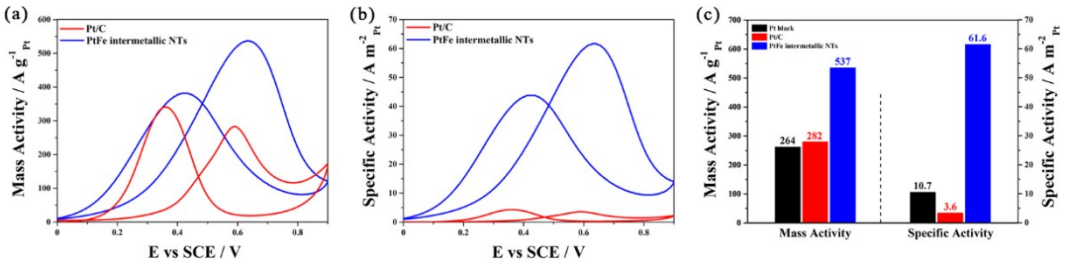


Fig. S5 (a) Mass-normalized, (b) ECSA-normalized cyclic voltammograms of Pt/C (red line) and PtFe intermetallic NTs (blue line) in the N_2-saturated 1 M CH_3OH + 0.5 M H_2SO_4 solution at a scan rate of 50 mV s^{-1}, and (c) the comparison of the corresponding I_f of the related catalysts.

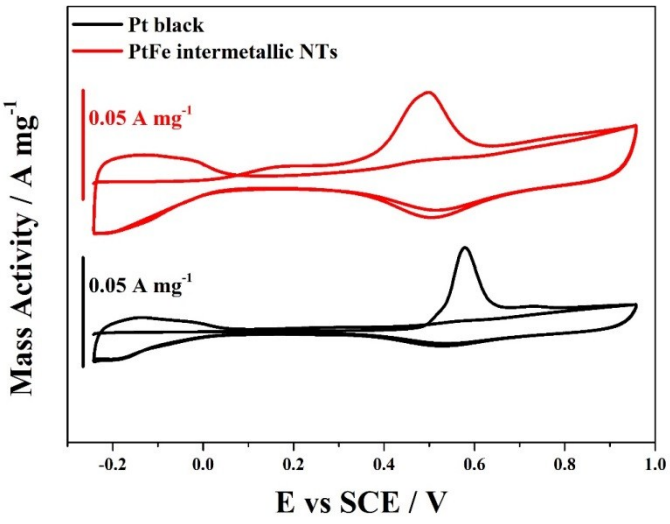


Fig. S6 Cyclic voltammograms of pre-absorbed CO at PtFe intermetallic NTs (red line) and Pt black (black line) in 0.5 M H_2SO_4 solution at the scan rate of 50 mV s^{-1}.

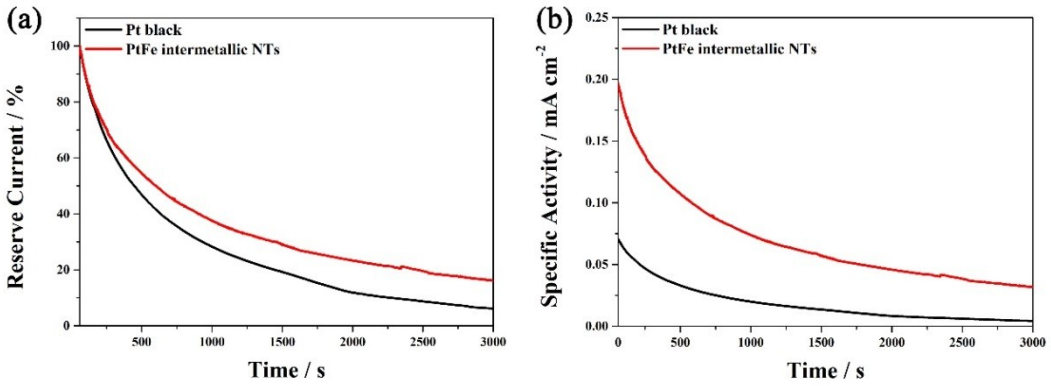


Fig. S7 Chronoamperometry curves of PtFe intermetallic NTs and Pt black in 1 M CH_3OH + 0.5 M H_2SO_4 solution at 0.7 V.

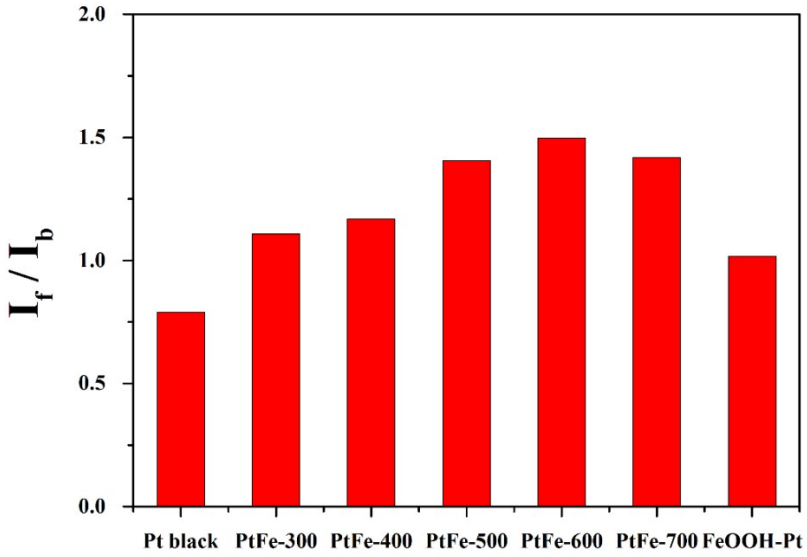
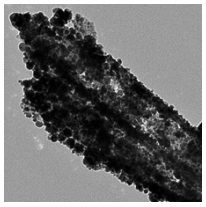
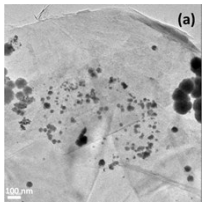
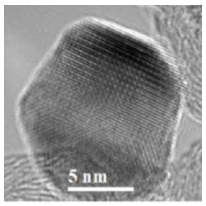
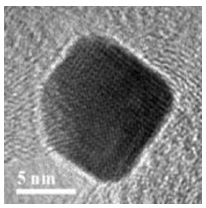
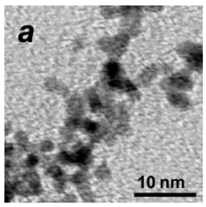
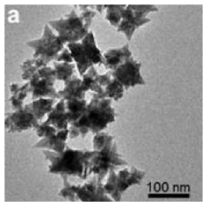
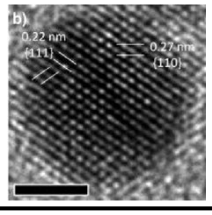


Fig. S8 I_f/I_b of PtFe-300, PtFe-400, PtFe-500, PtFe-600, PtFe-700, FeOOH-Pt and Pt black.

Table S1 Activity comparison of Pt-based intermetallic catalysts toward methanol oxidation reaction.

No	Catalysts	Mass Activity ($A\ g^{-1}_{Pt}$)	Specific Activity ($A\ m^{-2}_{Pt}$)	Electrolyte	Morphology	Ref.
1	PtFe intermetallic nanotube	536	61.64	0.5 M H_2SO_4 and 1 M CH_3OH solution		Our work
2	Ga-Pt intermetallic nanoparticle embedded in graphene	76	14.80	0.5 M KOH and 2M CH_3OH solution		*Electrochim. Acta*, 2015, **190**, 659-667
3	Pt_3Ti/C inter-metallic nanoparticle	149	0.31	0.1 M $HClO_4$ and 1 M CH_3OH solution		*J. Am. Chem. Soc.*, 2014, **136**, 10206-10209
4	Pt_3V/C inter-metallic nanoparticle	200	0.38	0.1 M $HClO_4$ and 1 M CH_3OH solution		*J. Am. Chem. Soc.*, 2014, **136**, 10206-10209
5	Pt_3Ti intermetallic nanoparticles	56	6.10	0.5 M $HClO_4$ and 0.5 M CH_3OH solution		*J. Am. Chem. Soc.*, 2008, **130**, 5452-5458
6	Cubic intermetallic $PtCu_3$ nanocages	50	141.0	0.1 M $HClO_4$ and 1 M CH_3OH solution solution		*J. Am. Chem. Soc.*, 2012, **134**, 13934−13937
7	Intermetallic Pt_3Zn nanocrystals	250	9.50	0.5 M methanol and 0.1 M CH_3OH solution		*ACS Nano*, 2012, **6**, 5642-5647