

Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

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Preparation of Carbon Supported Nanosegregated Pt Alloy Catalysts for the Oxygen Reduction Reaction Using a Silica Encapsulation Process to Inhibit Sintering Effect During Heat Treatment

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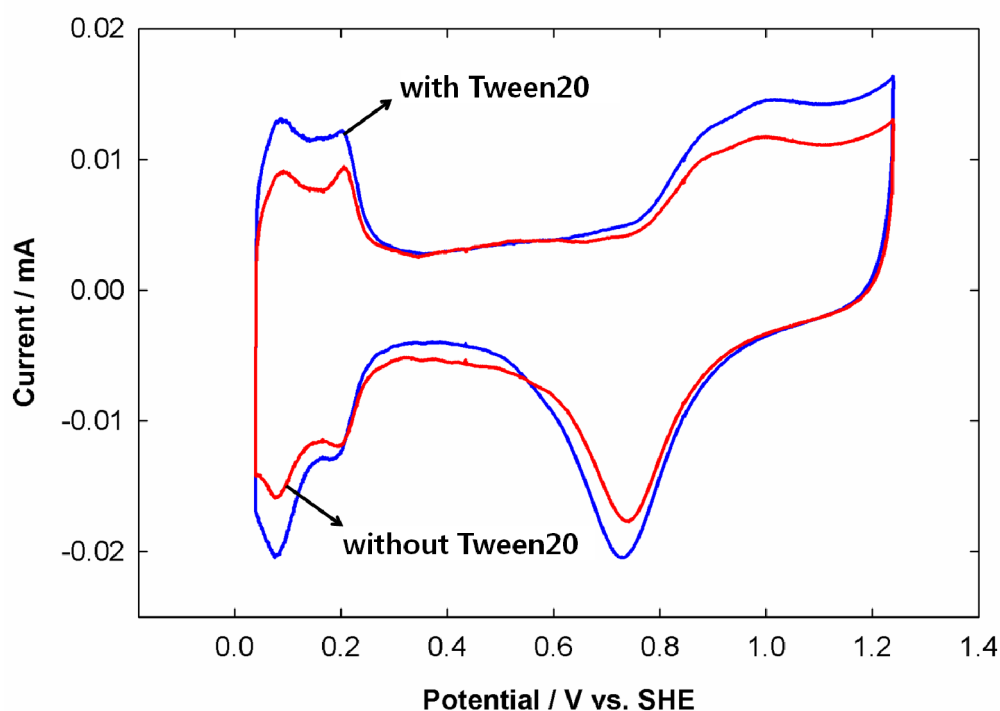


Fig. S1. Cyclic voltammograms of Pt₃Co₁/C (SiO₂-800) prepared in the presence or absence of Tween 20.

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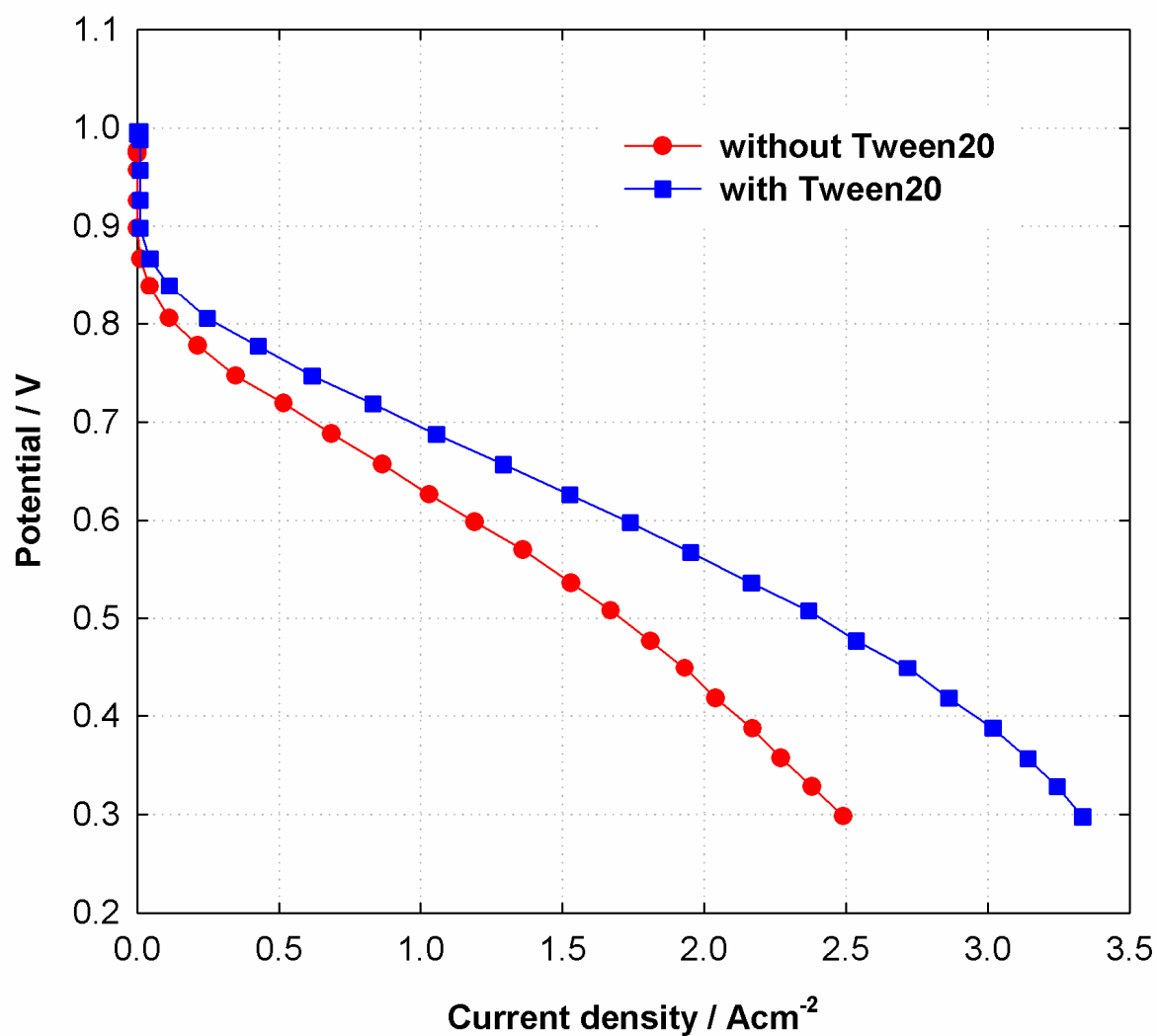


Fig. S2. Polarization curves of MEA using Pt₃Co₁/C (SiO₂-800) prepared in the presence or absence of Tween 20.

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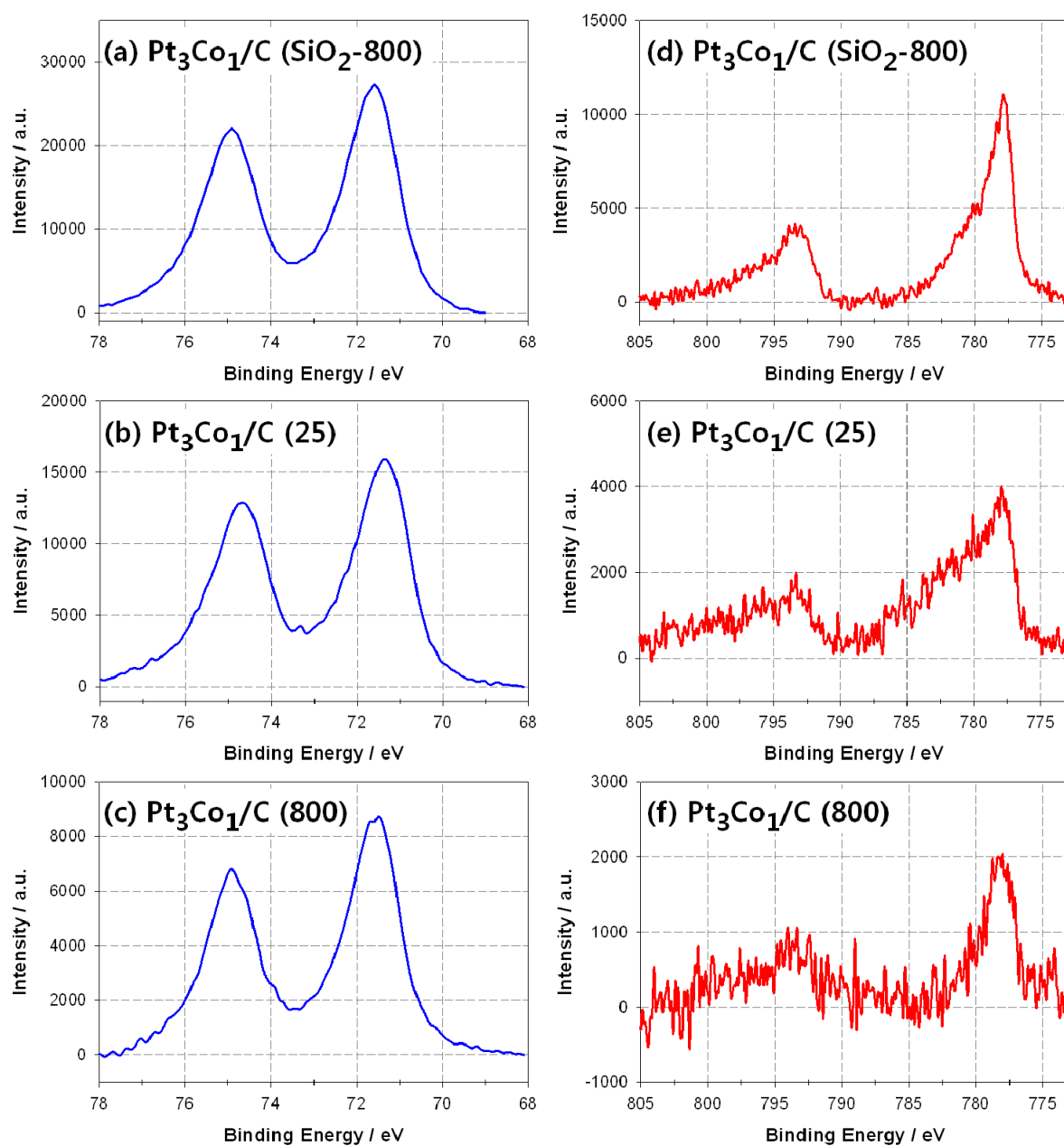


Fig. S3. XPS spectra of the Pt4f ((a)-(c)) and the Co2p ((d)-(f)) region for Pt₃Co₁/C (25), Pt₃Co₁/C (800) and Pt₃Co₁/C (SiO₂-800).

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Table S1. Bulk and surface concentration ratio between Pt and Co measured by ICP-AES and XPS for the prepared carbon supported Pt alloys.

Catalyst	Pt : Co (atomic ratio)	
	the ratio	the ratio
	determined by ICP-AES	determined by XPS
Pt ₃ Co ₁ /C (SiO ₂ -800)	2.9 : 1	4.1 : 1
Pt ₃ Co ₁ /C (25)	3.0 : 1	2.9 : 1
Pt ₃ Co ₁ /C (800)	3.0 : 1	4.0 : 1

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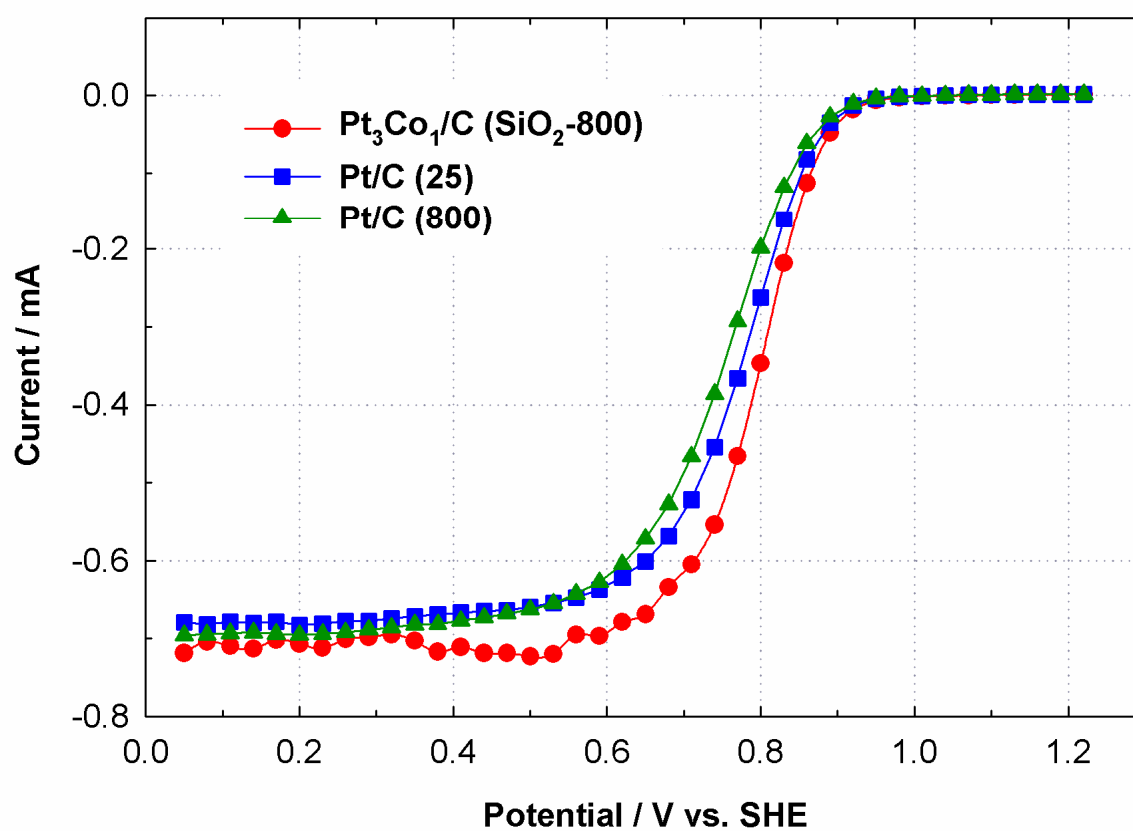


Fig. S4. Linear sweep voltammograms of Pt/C (25), Pt/C (800) and Pt₃Co₁/C (SiO₂-800) at 1200rpm under oxygen saturation. The experimental set-up is the same with the three electrode system used in the CV.

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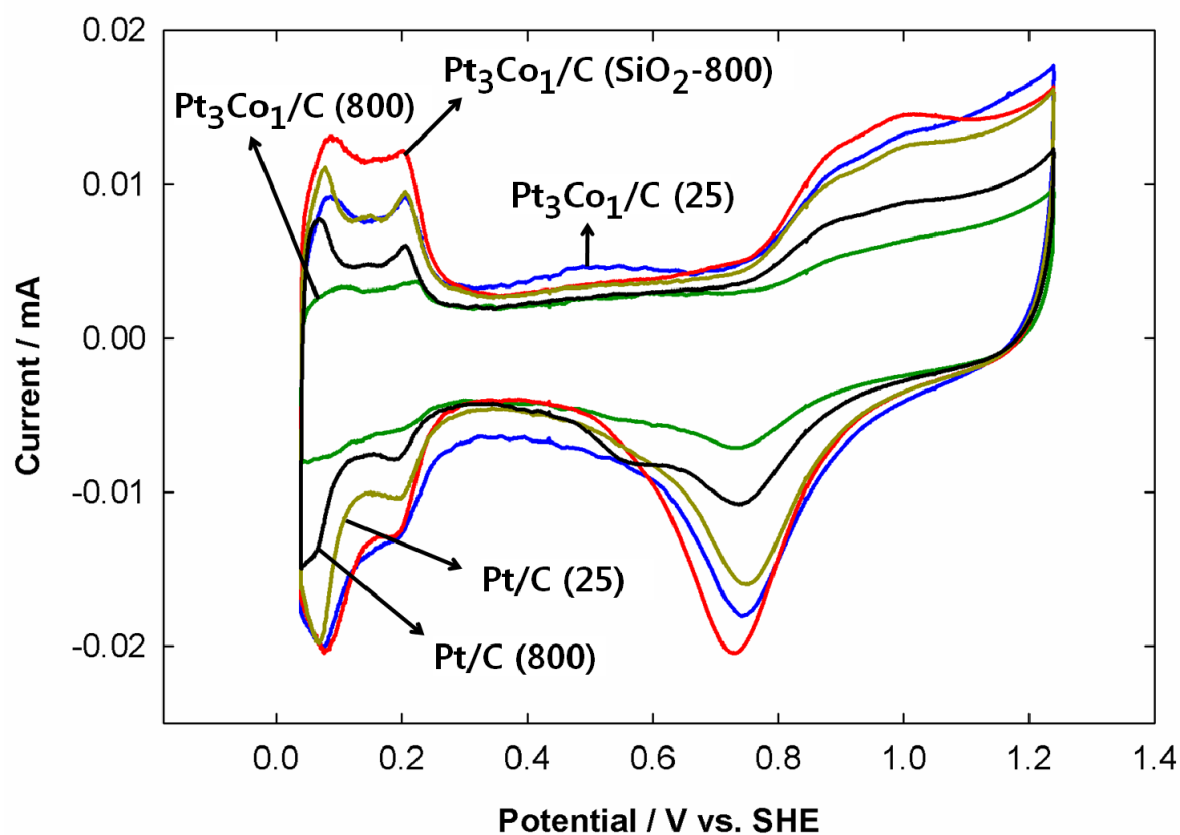


Fig. S5. Cyclic voltammograms of Pt₃Co₁/C (25), Pt₃Co₁/C (800), Pt/C (25), Pt/C (800) and Pt₃Co₁/C (SiO₂-800).

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Table S2. Electrochemical surface area of Pt₃Co₁/C (25), Pt₃Co₁/C (800), Pt/C (25), Pt/C (800) and Pt₃Co₁/C (SiO₂-800) measured by cyclic voltammograms.

Catalyst	Electrochemical surface area in CV (m ² g ⁻¹)
Pt ₃ Co ₁ /C (SiO ₂ -800)	51.9
Pt ₃ Co ₁ /C (25)	42.9
Pt ₃ Co ₁ /C (800)	12.6
Pt/C (25)	38.0
Pt/C (800)	22.9