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Supplementary Information

Effects of indium doping on methanol deep oxidation over Ag/CeO₂

Catalyst

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Table S1 kinetic parameters of methanol oxidation

Catalyst	T/K	1/T (1/K)	1/T*10 ⁻³ (1*10 ⁻³ K ⁻¹)	k/cm ³ ·g ⁻¹ ·s ⁻¹	ln(k)/cm ³ ·g ⁻¹ ·s ⁻¹	Ea/(KJ/mol)
Ag/CeO ₂	359	0.002786	2.785515	2.788881	1.025641	66.2
	364	0.002747	2.747253	3.503534	1.253772	
	369	0.002710	2.710027	4.954755	1.600348	
	374	0.002674	2.673797	6.686150	1.900038	
Ag/Ce _{0.95} In _{0.05} O _δ	359	0.002786	2.785515	2.907492	1.067291	65.2
	364	0.002747	2.747253	3.983991	1.382284	
	369	0.002710	2.710027	5.445153	1.694726	
	374	0.002674	2.673797	6.936970	1.936865	
Ag/Ce _{0.90} In _{0.10} O _δ	359	0.002786	2.785515	5.199531	1.648568	60.7
	364	0.002747	2.747253	7.694782	2.040542	
	369	0.002710	2.710027	9.756009	2.277883	
	374	0.002674	2.673797	11.878775	2.474753	
Ag/Ce _{0.85} In _{0.15} O _δ	359	0.002786	2.785515	4.225443	1.441124	64.7
	364	0.002747	2.747253	6.436212	1.861940	
	369	0.002710	2.710027	8.717927	2.165382	
	374	0.002674	2.673797	10.017915	2.304375	
Ag/Ce _{0.80} In _{0.20} O _δ	359	0.002786	2.785515	2.552251	0.936976	67.4
	364	0.002747	2.747253	3.264518	1.183112	
	369	0.002710	2.710027	4.710819	1.549862	
	374	0.002674	2.673797	6.187149	1.822474	

Table S2 The results of three activity tests

Ag/CeO ₂		Ag/Ce _{0.95} In _{0.05} O _δ		Ag/Ce _{0.90} In _{0.10} O _δ		Ag/Ce _{0.85} In _{0.15} O _δ		Ag/Ce _{0.80} In _{0.20} O _δ	
T/ °C	CH ₃ OH Conversion /%	T/ °C	CH ₃ OH Conversion /%	T/ °C	CH ₃ OH Conversion /%	T/ °C	CH ₃ OH Conversion /%	T/ °C	CH ₃ OH Conversion /%
87	2.6	90	3.7	89	8.9	88	7.9	87	1.1
	3.6		3.7		8.9		7.8		1.3
	3.1		3.7		8.8		7.9		1.1
107	7.7	110	12	110	29.2	110	20.5	110	6.8
	8.8		11.8		29.3		20.4		6.6
	8.7		12.2		29.2		20.5		6.8
128	31.5	130	34.5	130	53.3	130	46	130	29.7
	30.5		34.4		53.1		45.9		29.8
	32.5		34.5		53.4		45.9		29.6
149	51.4	150	57.4	150	82.4	150	68.2	150	46.4
	51.9		57.6		82.5		68.1		46.3
	51		57.5		82.4		68.1		46.4
160	66.5	160	71.4	160	92.7	160	77.4	160	52.9
	66.4		71.2		92.6		77.3		52.8
	66.5		71.6		92.7		77.4		52.9
170	78.7	170	80.9	170	97.1	170	82.4	170	69
	78.9		80.8		97.2		82.5		68.9
	78.8		80.9		97.1		82.4		69
190	86	190	89.5	190	98.2	190	91.2	190	78.9
	85.9		89.2		98.1		91.3		78.8
	86		89.5		98.2		91.1		78.9
210	92.8	210	94.5	210	99.1	210	97.4	210	91
	92.7		94.4		99.1		97.4		90.9
	92.8		94.5		99.1		97.3		91.1
230	96.8	230	96.4	230	99.2	230	98.6	230	94.7
	96.7		96.4		99.1		98.5		94.6
	96.9		96.3		99.2		98.6		94.7
250	97.7	250	97.7	250	99.4	250	99	250	97.2
	97.7		97.8		99.4		98.9		97.1
	97.6		97.7		99.3		99		97.2

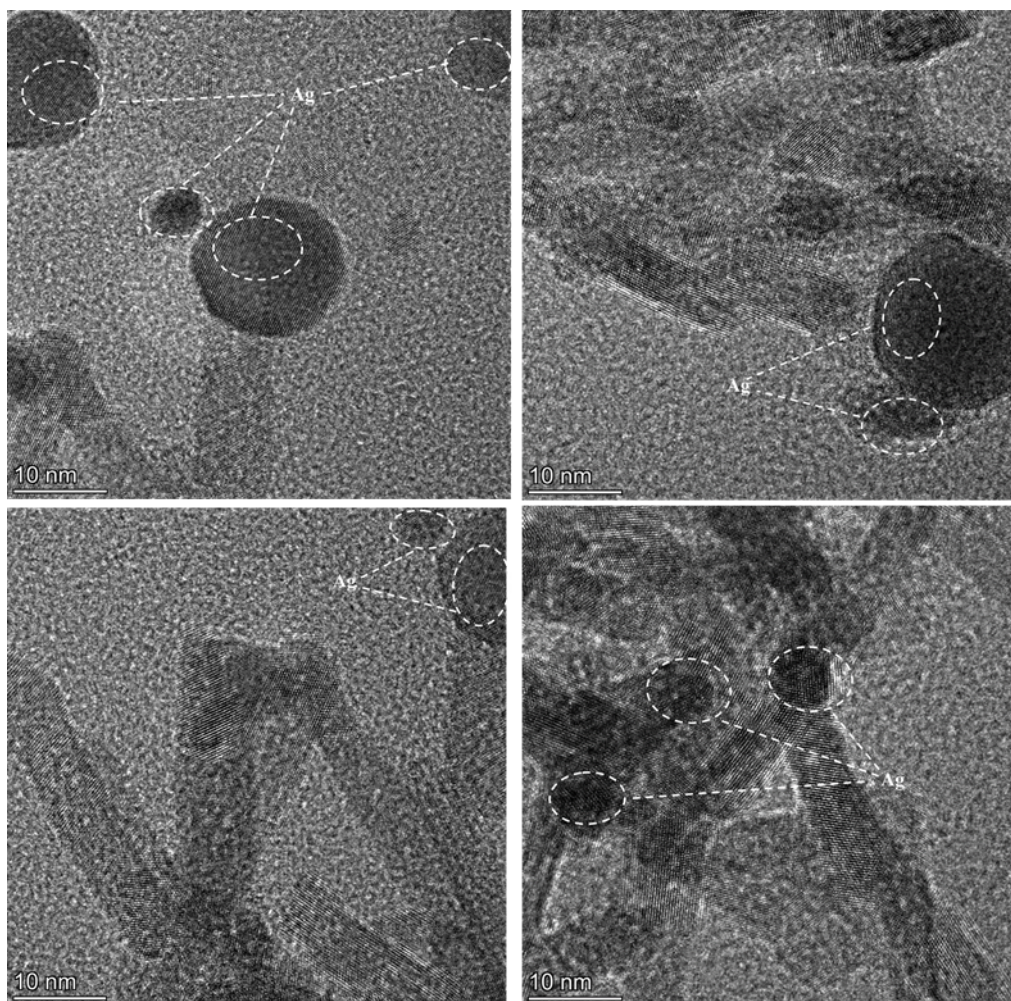


Fig. S1 HR-TEM image of Ag/Ce_{0.90}In_{0.10}O_δ.

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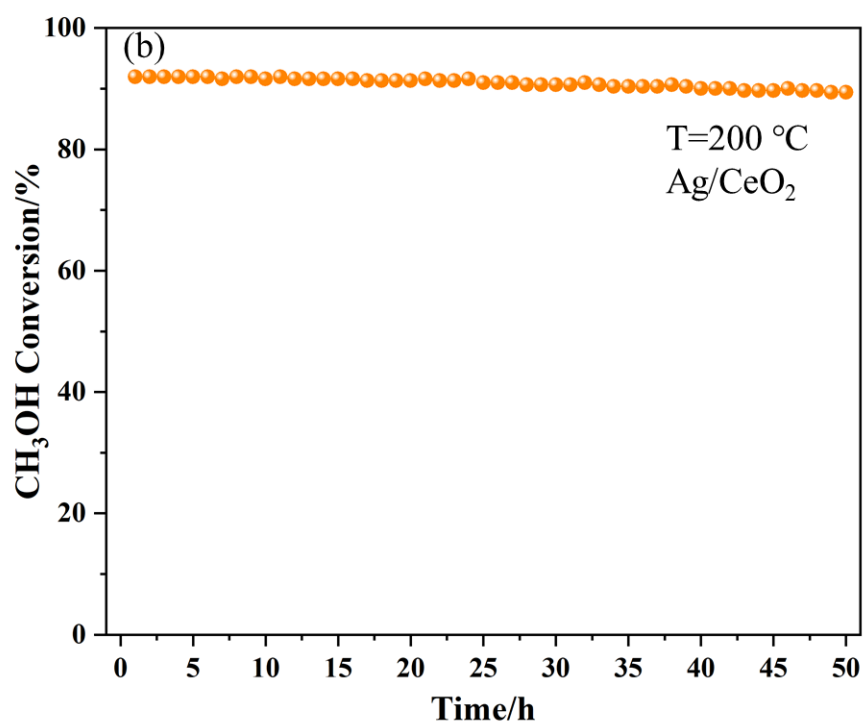


Fig. S2 Catalytic durability of Ag/CeO₂ for CH₃OH oxidation at 200 °C.

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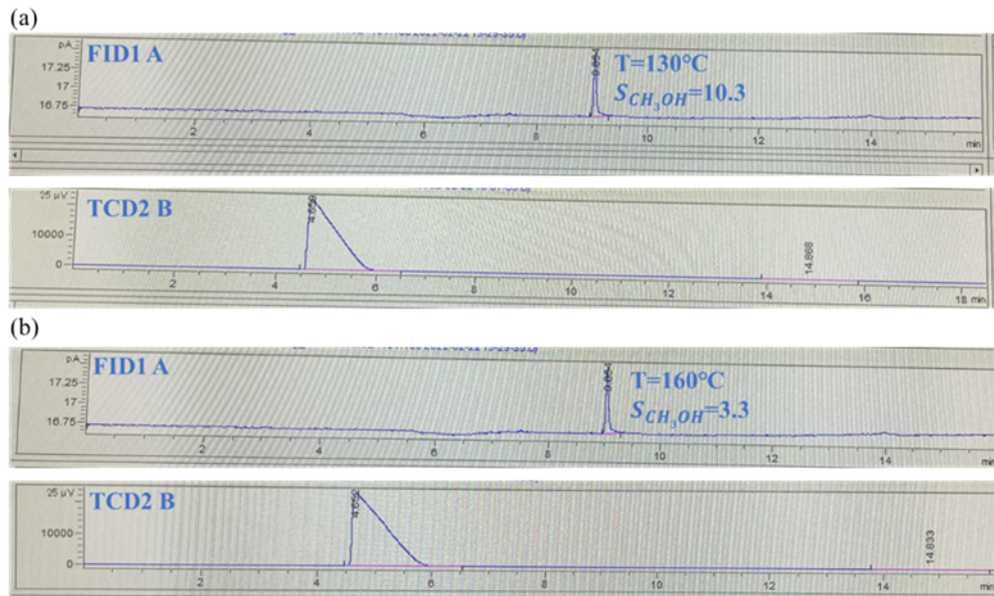
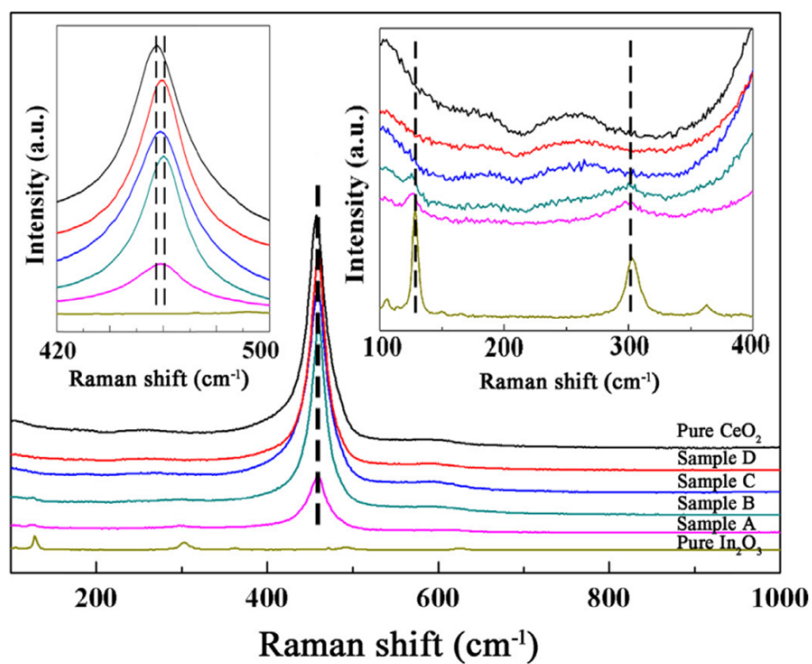


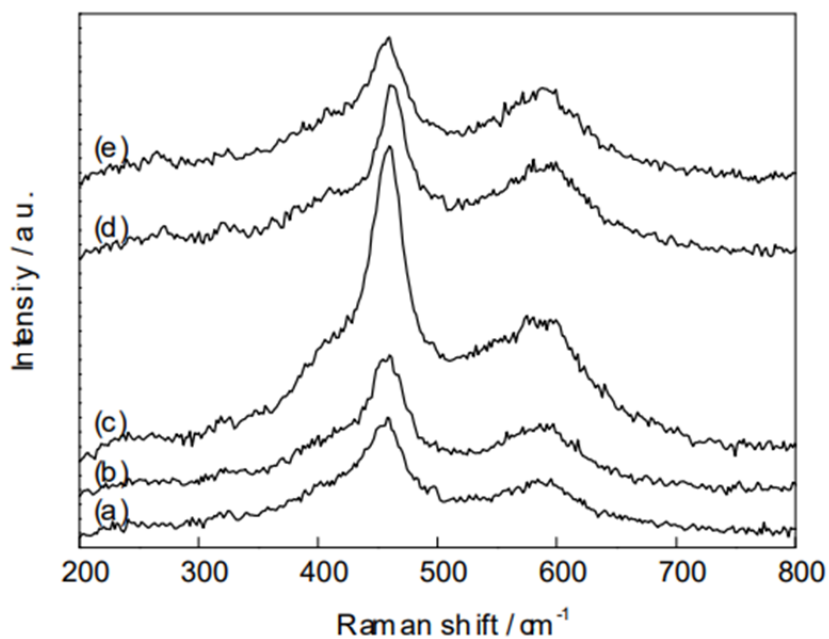
Fig. S3 The original chromatograms of product analysis at T_{50} and T_{90} .

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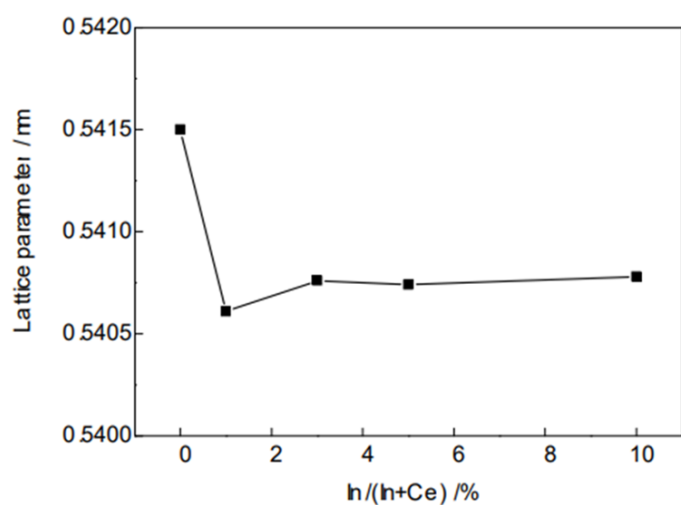


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Fig.S4 Raman spectra of all samples(In sample A-D, the weight ratio of In_2O_3 : CeO_2 is 3:1, 1:1, 1:3 and 1:9 respectively.)¹



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 29 Fig.S5 Raman spectra of the samples synthesized solvothermal with In/(In+Ce) of 0 (a), 1% (b), 3%
 30 (c), 5% (d) and 10% (e) at 200 °C for 24 h followed by calcination at 500 °C for 2 h in air.²
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 33 Fig.S6 Lattice parameters of the samples synthesized solvothermal with different In/(In+Ce) ²
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36 Reference

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