Electronic Supplementary Information (ESI)

Morphology-dependent performance of Zr-$CeVO_4$/TiO_2 for selective catalytic reduction of NO with NH_3

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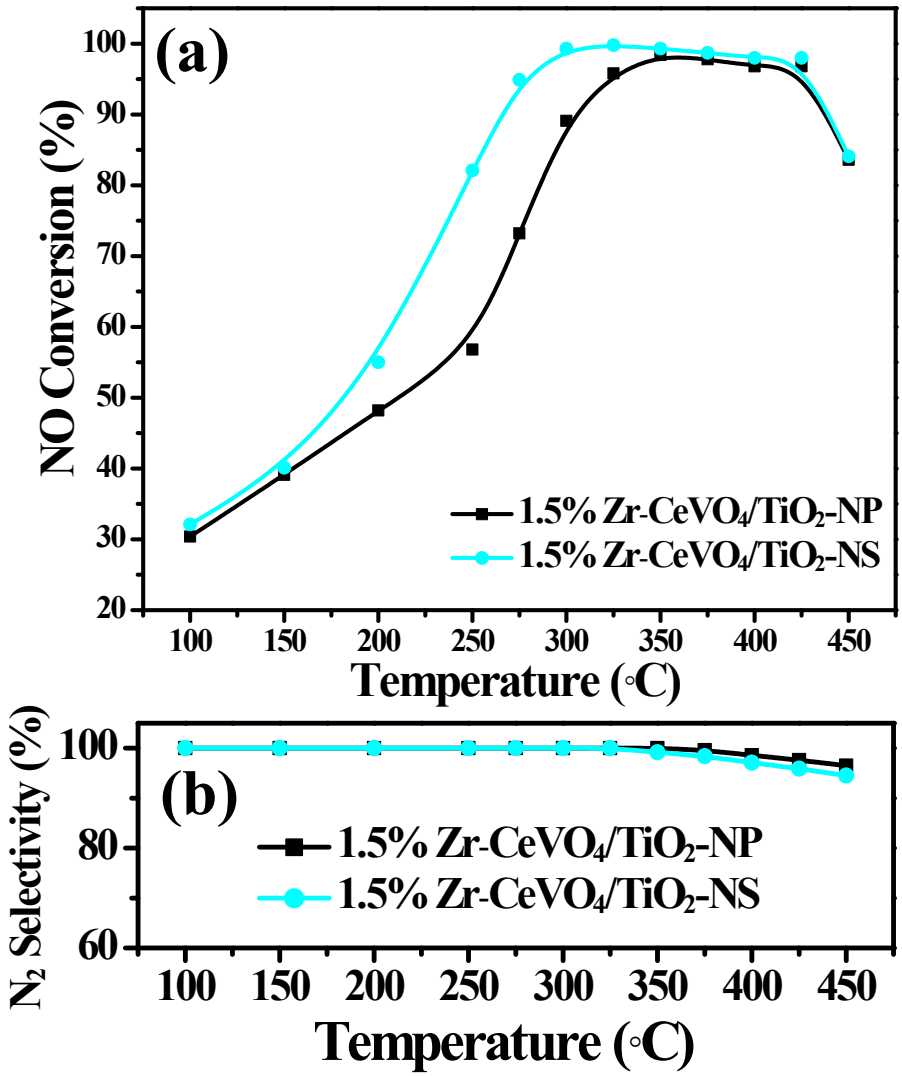

Fig. S1 (a) NO conversion and (b) N_2 selectivity in NH_3-SCR reaction as a function of temperature in the feed gas of 250 ml·min^{-1} total rate over the 1.5 wt.% Zr-$CeVO_4/TiO_2$-NP and 1.5 wt.% Zr-$CeVO_4/TiO_2$-NS catalysts, respectively. Reaction conditions: [NO] = [NH_3] = 500 ppm, [O_2] = 5%, GHSV = 25, 000 h^{-1}.

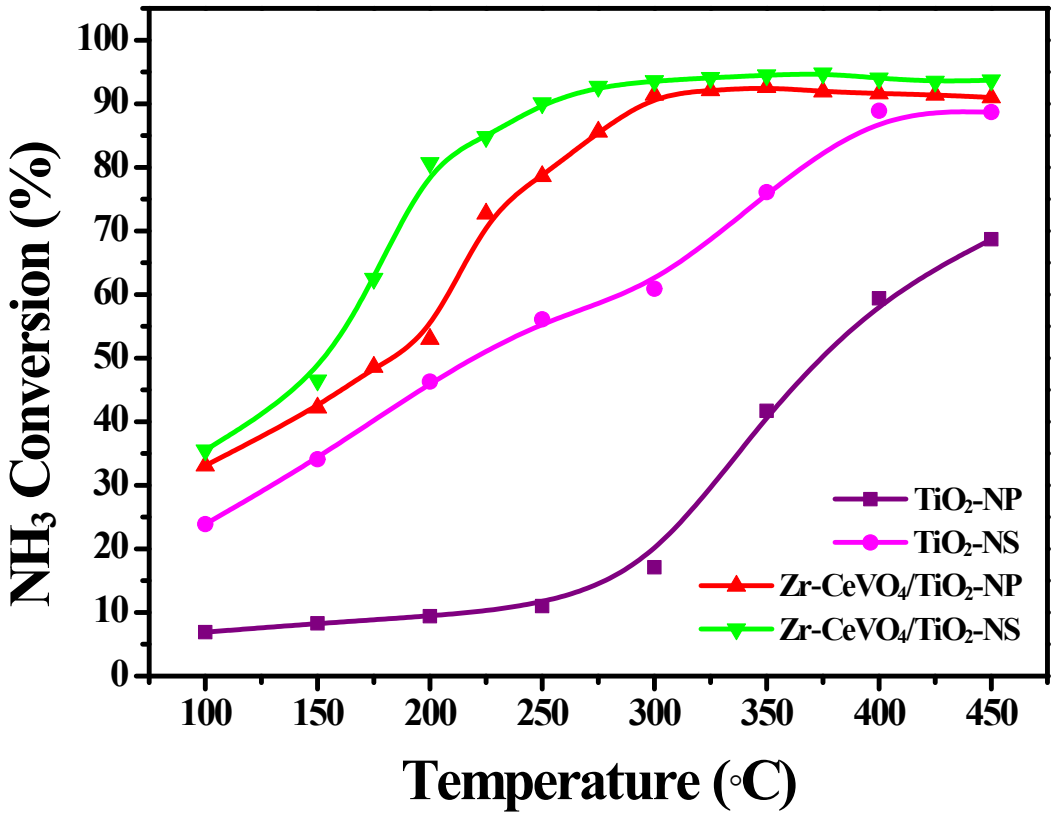

Fig. S2 NH_3 conversion in NH_3-SCR reaction as a function of temperature in the feed gas of 250 ml·min^{-1} total rate over the TiO_2-NP, TiO_2-NS, Zr-$CeVO_4$/TiO_2-NP and Zr-$CeVO_4$/TiO_2-NS catalysts, respectively. Reaction conditions: [NO] = [NH_3] = 500 ppm, [O_2] = 5%, GHSV = 25, 000 h^{-1}.

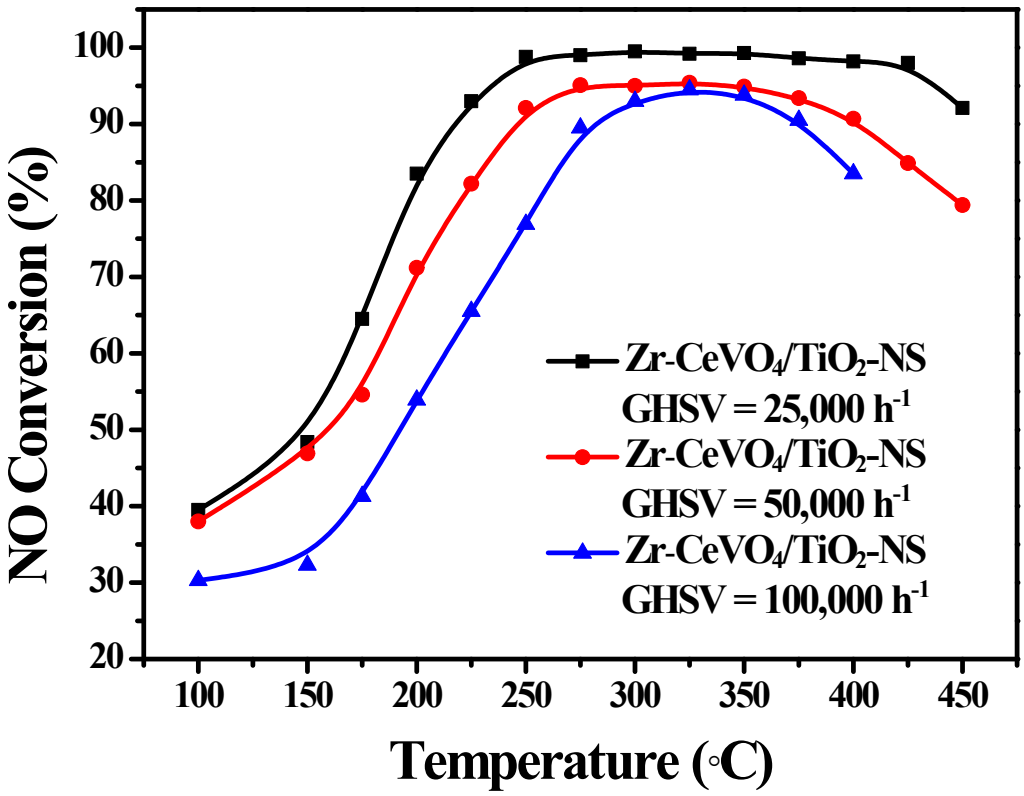

Fig. S3 NH_3-SCR activity of Zr-$CeVO_4$/TiO_2-NS catalyst under different GHSVs (25,000 h^{-1}, 50,000 h^{-1} and 100,000 h^{-1}). Reaction conditions: [NO] = [NH_3] = 500 ppm, [O_2] = 5%, and N_2 balance.

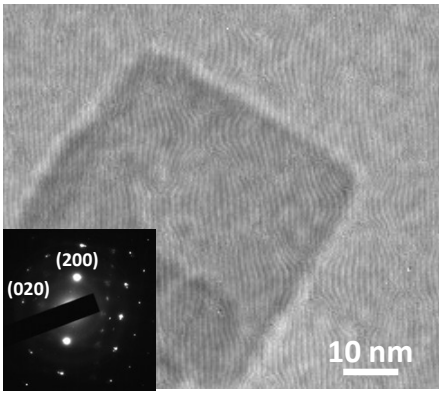

Fig. S4 TEM image and corresponding SAED pattern of Zr-$CeVO_4$/TiO_2-NS catalyst after calcination.

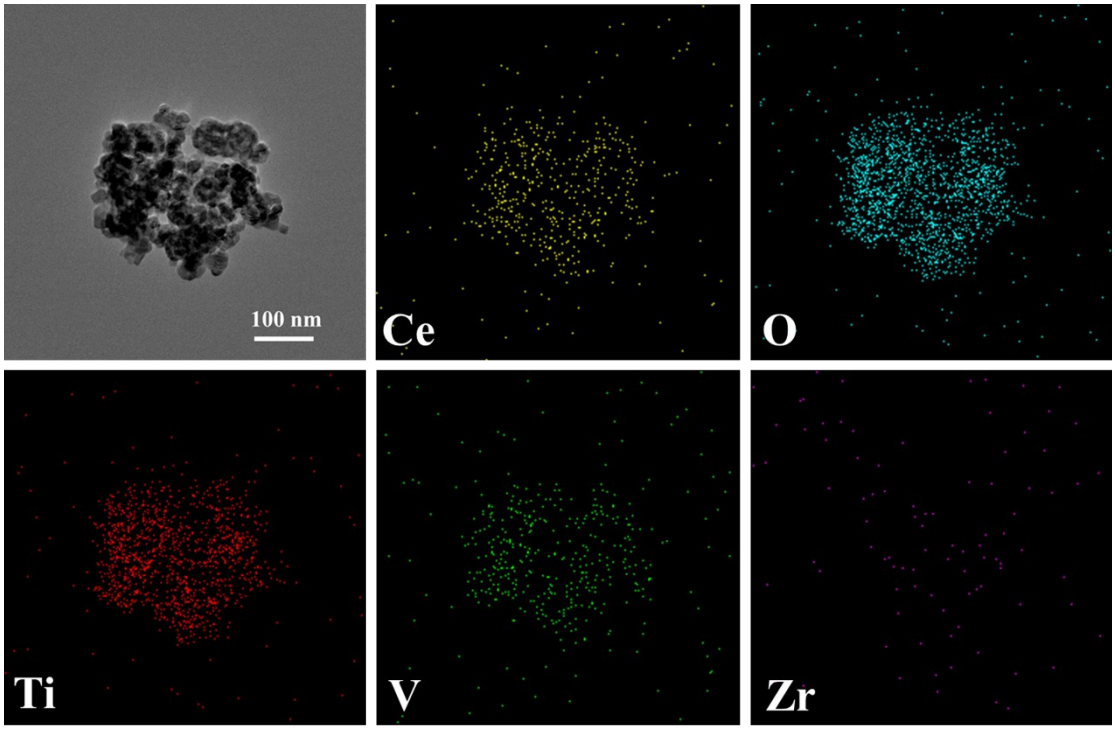

Fig. S5 TEM and EDX-mapping images of the Zr-$CeVO_4$/TiO_2-NP catalyst.

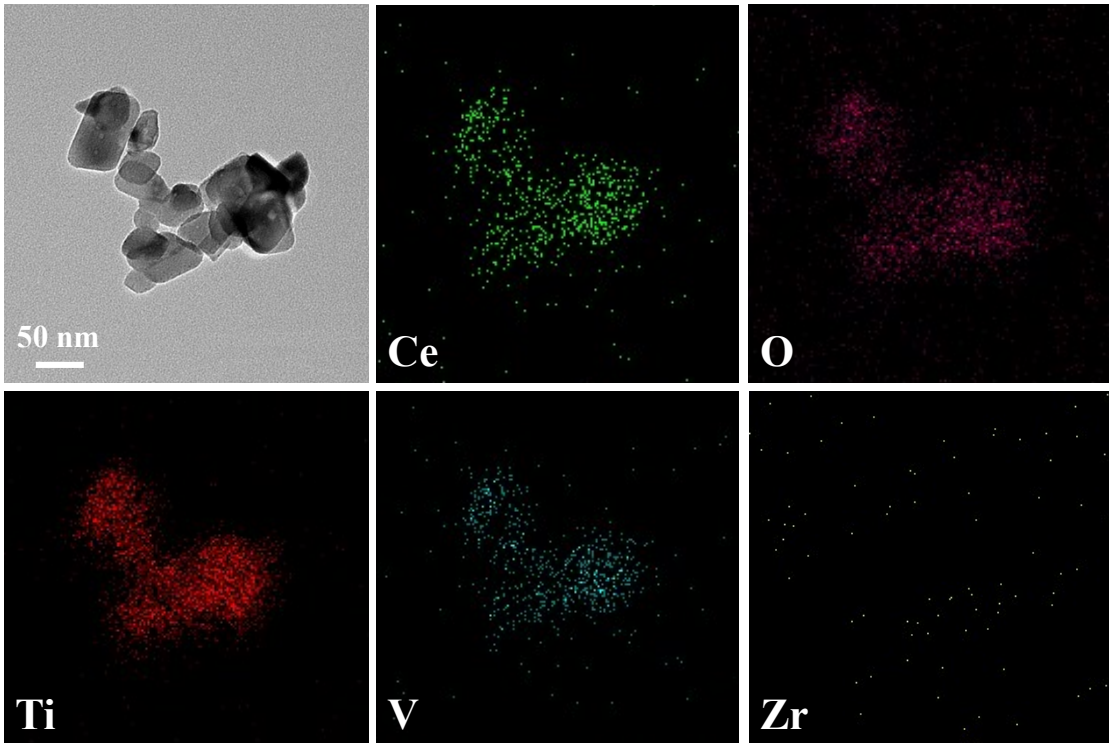

Fig. S6 TEM and EDX-mapping images of the Zr-$CeVO_4$/TiO_2-NS catalyst.

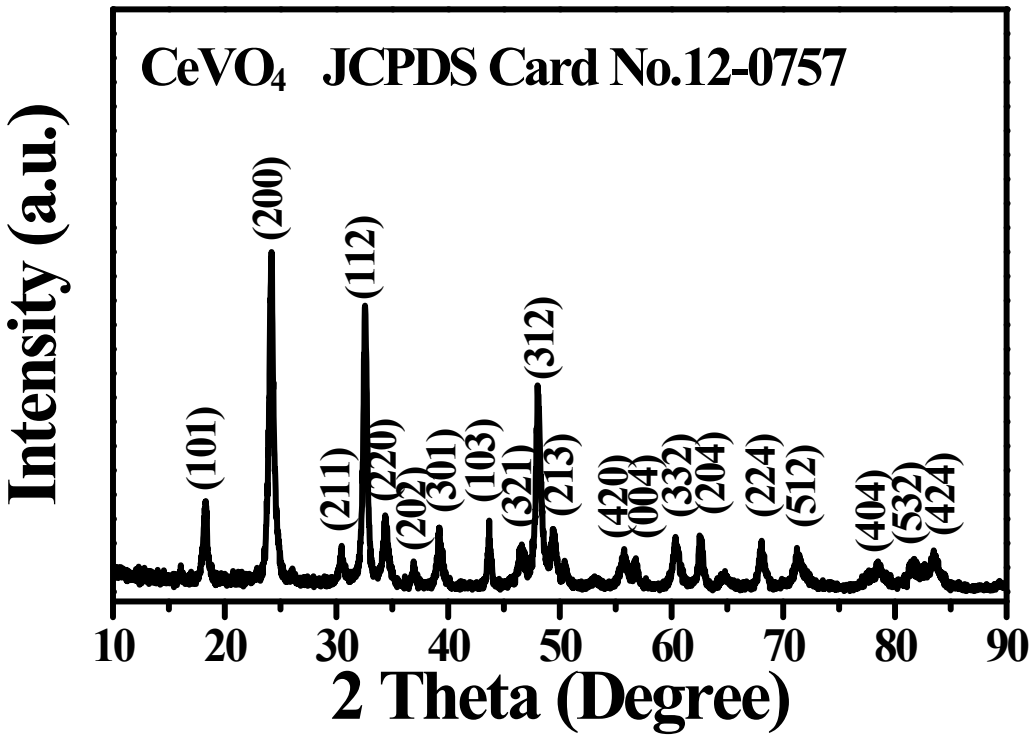

Fig. S7 XRD patterns of the $Ce_{0.85}Zr_{0.15}VO_4$ catalysts prepared by a rotary evaporator.

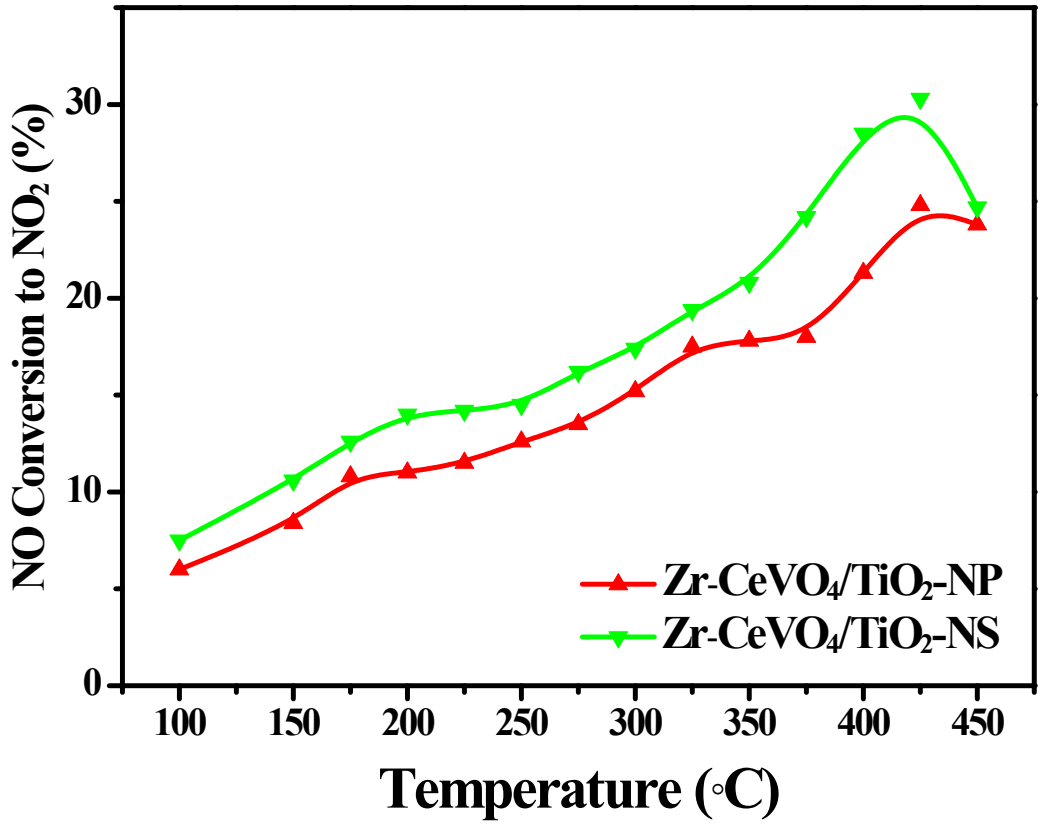

Fig. S8 NO oxidation over the TiO_2-NP, TiO_2-NS, Zr-$CeVO_4$/TiO_2-NP and Zr-$CeVO_4$/TiO_2-NS catalysts. Reaction conditions: [NO] = 500 ppm, [O_2] = 5%, GHSV = 25, 000 h^{-1}.

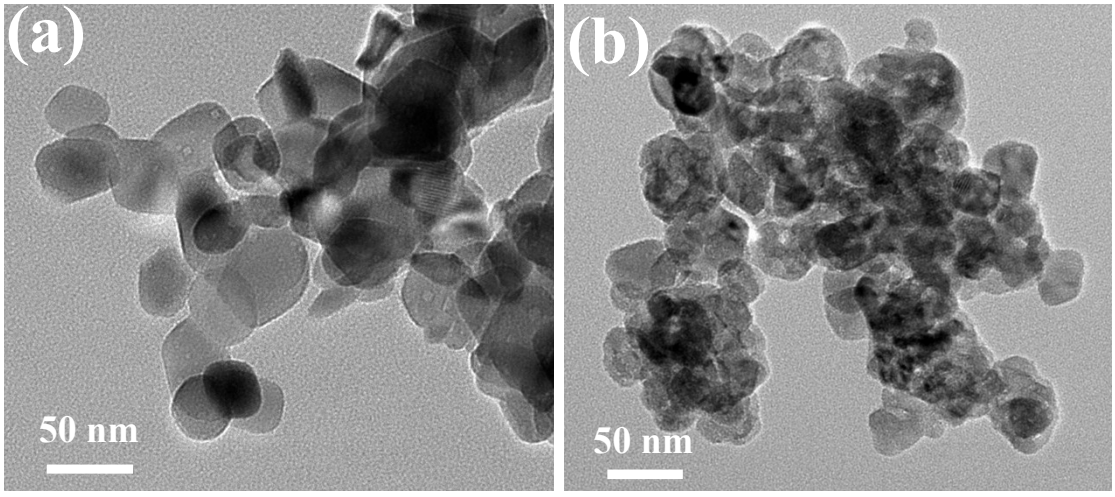

Fig. S9 TEM images of the (a) Zr-$CeVO_4$/TiO_2-NS and (b) Zr-$CeVO_4$/TiO_2-NP catalysts after the stability test.

Table S1: The corresponding amount of reactants over 1.5 wt.% Zr-$CeVO_4$/supports and 3.0 wt.% Zr-$CeVO_4$/supports.

Samples	$m_{Ce(NO3)3·6H2O}$	$m_{Zr(NO3)4·5H2O}$	m_{NH4VO3}
1.5 wt.% Zr-$CeVO_4$/supports	0.0223g	0.0039g	0.0071g
3.0 wt.% Zr-$CeVO_4$/supports	0.0447g	0.0078g	0.0142g

Table S2: The corresponding content of Ce, Zr, V and Ti over Zr-$CeVO_4$/TiO_2-NP and Zr-$CeVO_4$/TiO_2-NS catalysts through the ICP test.

Samples	Ce (wt.%)	Zr (wt.%)	V (wt.%)	Ti (wt.%)
The designed content	1.44	0.17	0.61	58.20
Zr-$CeVO_4$/TiO_2-NP	1.11	0.17	0.53	53.15
Zr-$CeVO_4$/TiO_2-NS	1.31	0.18	0.57	53.81