Supporting Information

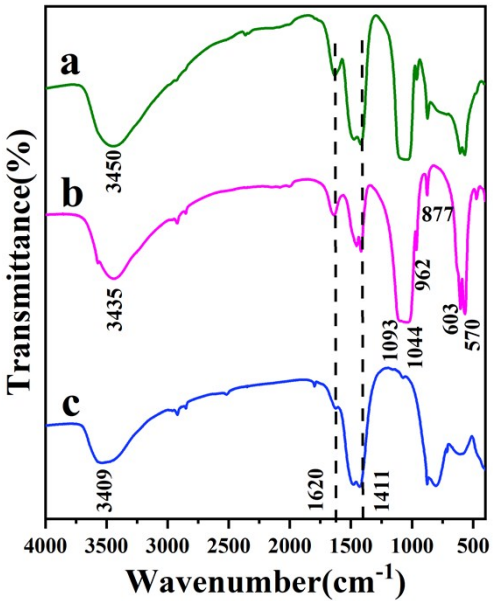

Fig.S1 FT-IR spectra of Au/HAP-LDH (a), Au/HAP (b) and Au/LDH(c) samples with the Au loading amount of 0.2 wt%.

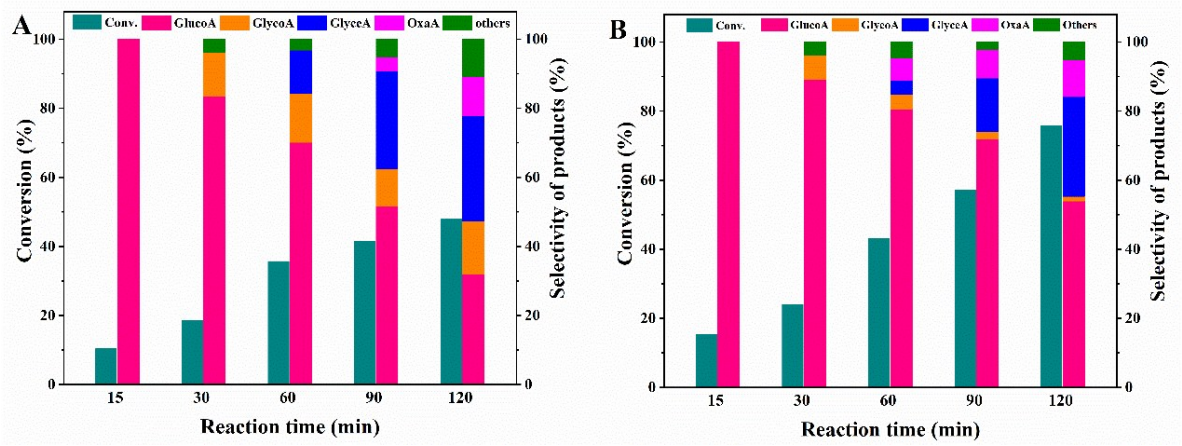

Fig.S2 Change in the conversion and selectivity in the oxidation of glucose with the reaction time over the Au/HAP (A) and Au/LDH (B) catalysts with the Au loading amount of 0.2 wt%. Reaction conditions: 110 °C; oxygen partial pressure, 0.5 MPa.

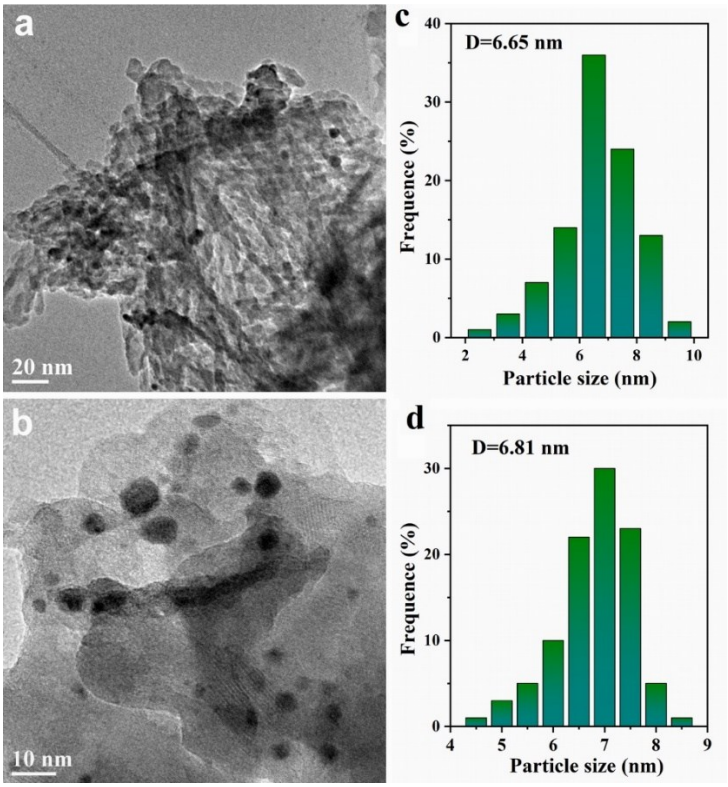

Fig.S3 TEM images and histograms of the particle size distributions of Au/HAP-LDH samples with different Au loading amounts of 0.5 wt % (a and c) and 2.0 wt % (b and d).

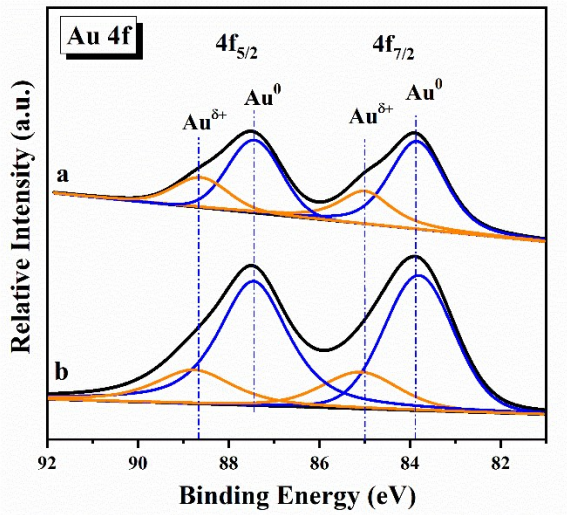

Fig.S4 XPS of Au 4f regions of supported Au/HAP-LDH samples with different Au loading amounts of 0.5 wt% (a) 2.0 wt % (b).

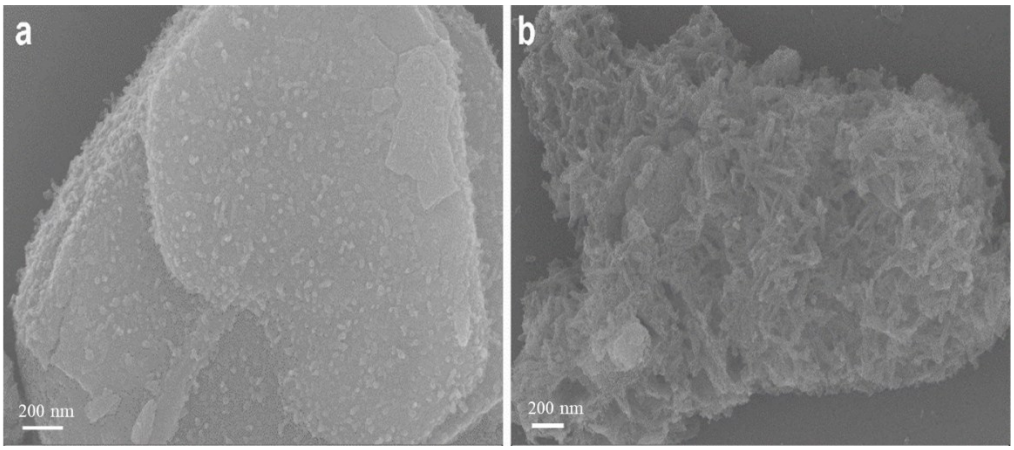

Fig.S5 SEM images of Au/HAP-LDH samples with the Au loading amount of 0.2 wt% and different Ca/P molar ratios of 1.8 (a) and 0.9 (b).

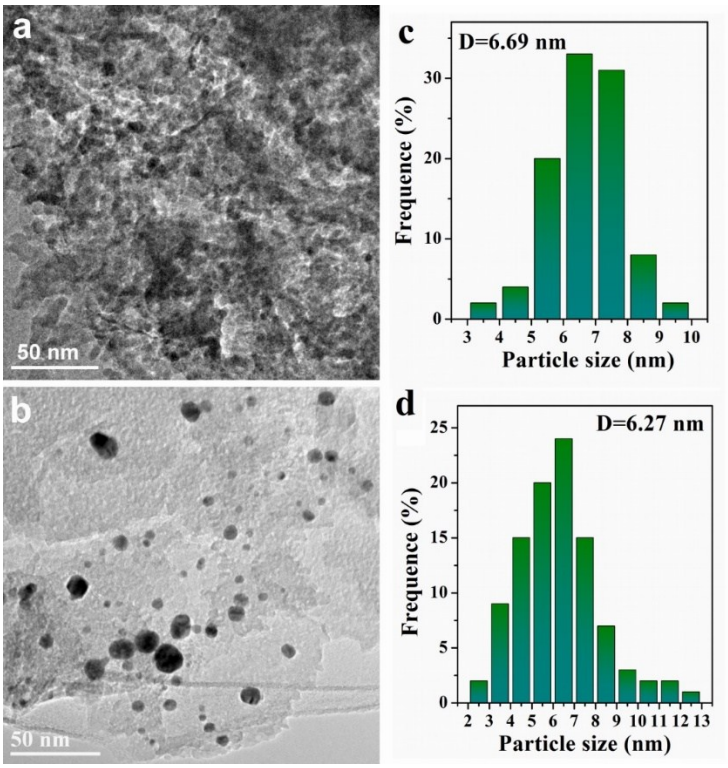

Fig.S6 TEM images and histograms of the particle size distributions of spent Au/HAP-LDH (a and c) and spent Au/LDH (b and d) with the Au loading amount of 0.2 wt% after four consecutive cycles.

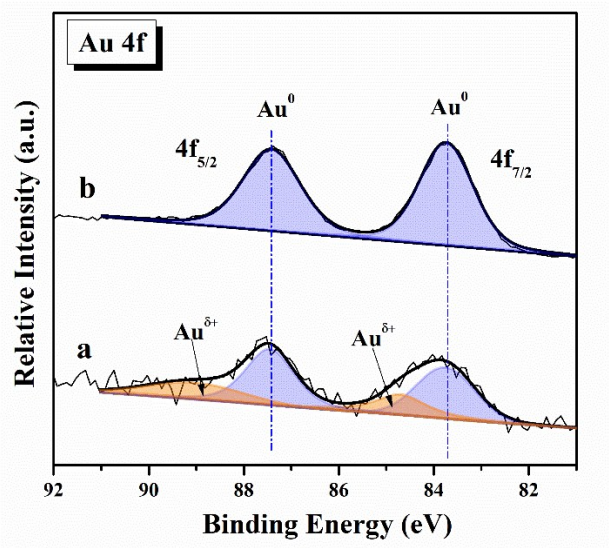

Fig.S7 XPS of Au 4f region for Au/HAP-LDH (a) and Au/LDH (b) catalysts with the Au loading amount of 0.2 wt% after four consecutive cycles.

Table S1 Catalytic performances of other reported mono-metallic Au-based catalysts for glucose oxidation to produce GlucoA using molecular oxygen as the oxidant.

Catalyst	Time (min)	Temp. (°C)	O_2 flow (ml/min)	Base	Glu/Au (mol/mol)	Conv. (%)	Selectivity (%)	TOF (h^{-1})	Ref.
1%-Au/AC	n.a.	50	20	NaOH	1000:1	n.a	99	500	[66]
0.89% -Au/AC	20	50	20	NaOH	1000:1	100	>99	3000	[67]
0.5% -Au/AC	10	30	1000	NaOH	1000:1	60	n.a.	50120	[68]
1.38%- Au/AC	15	60	60	NaOH	850:1	98	100	5440	[69]
0.45% -Au/TiO_2	170	40	flow	KOH	2000:1	96	98	n.a.	[70]
0.02%- Au/CeO_2	720	65	2.3[a]	none	9000:1	43	n.a.	3100	[9]
0.94%- Au/CMK-3	120	110	3[a]	none	1000:1	92	87	17712	[10]
0.2%-Au/HAP-LDH	120	110	5[a]	none	1000:1	99	>99	20225	This work

[a] Oxygen pressure in bar; [b] the molar ratio of glucose to Au species.