Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Electrochemical Tuning of $Pd_{100-x}Au_x$ Bimetallics towards Ethanol Oxidation: Effect of Induced d-band Center Shift and Oxophillicity

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Supplementary Information

Table S1 shows the calculations used for determination of mass loading. The molar fractions of Au and Pd are given by f_{Au} and $f_{Pd,}$ respectively. Z_{Au} and Z_{Pd} are the respective electrochemical equivalents of Au (0.68122 mg C^{-1}) and Pd (0.55289 mg C^{-1}) obtained from the 'Standard Table of Electrochemical Equivalents and their Derivatives' authored by Carl Hering and Frederick H. Getman (1917). Z_{comp} denotes the electrochemical equivalent of the respective composition.

Composition	Charge utilized (in mC)	f_{Pd}	f_{Au}	$Z_{Pd}*f_{Au}$	$Z_{Au}*f_{Pd}$	$Z_{Pd}*f_{Au}+ Z_{Au}*f_{Pd}$	$Z_{Au}*Z_{Pd}$	Z_{comp}	Mass deposited m_a=Charge*Z_{comp}
Pd	118.942	1	-	-	-	-	-	0.55289	0.065761842
$Pd_{90}Au_{10}$	235.603	0.9	0.1	0.055289	0.613098	0.668387	0.37663	0.563490912	0.132760149
$Pd_{80}Au_{20}$	215.354	0.8	0.2	0.110578	0.544976	0.655554	0.37663	0.574521702	0.123725547
$Pd_{70}Au_{30}$	283.591	0.7	0.3	0.165867	0.476854	0.642721	0.37663	0.585992989	0.166182338
$Pd_{60}Au_{40}$	247.618	0.6	0.4	0.221156	0.408732	0.629888	0.37663	0.597931696	0.148058651
$Pd_{50}Au_{50}$	338.428	0.5	0.5	0.276445	0.34061	0.617055	0.37663	0.610366985	0.206565278
$Pd_{40}Au_{60}$	560.96	0.4	0.6	0.331734	0.272488	0.604222	0.37663	0.623330498	0.349663476
$Pd_{30}Au_{70}$	448.701	0.3	0.7	0.387023	0.204366	0.591389	0.37663	0.636856621	0.285758203
$Pd_{20}Au_{80}$	559.42	0.2	0.8	0.442312	0.136244	0.578556	0.37663	0.650982792	0.364172793
$Pd_{10}Au_{90}$	597.175	0.1	0.9	0.497601	0.068122	0.565723	0.37663	0.665749846	0.397569164
Au	454.805	-	1	-	-	-	-	0.68122	0.309822262

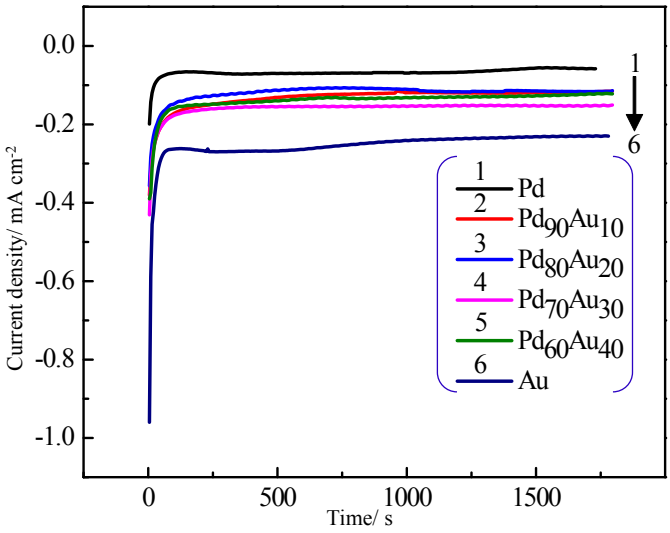

Fig. S1. Representative I-t curves obtained during electrodeposition of the $Pd_{100-x}Au_x$ compositions.

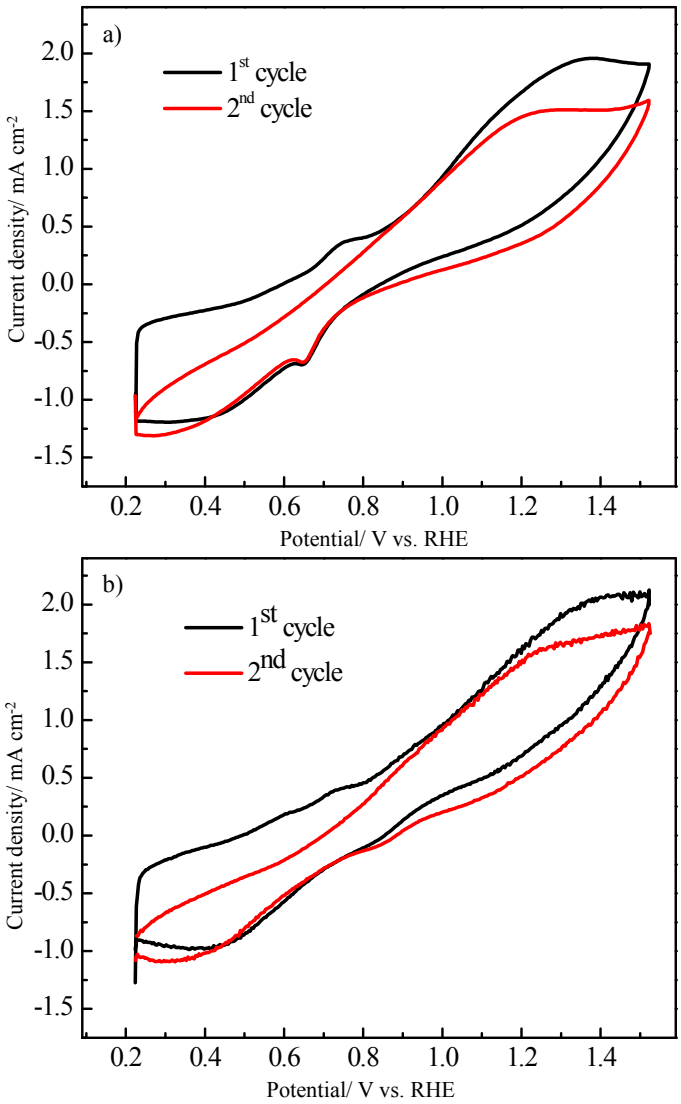

Fig. S2. CO stripping curves obtained for (a) Pd and (b) $Pd_{70}Au_{30}$ compositions in 1 M KOH. Scan rate: 20 mV s^{-1}.

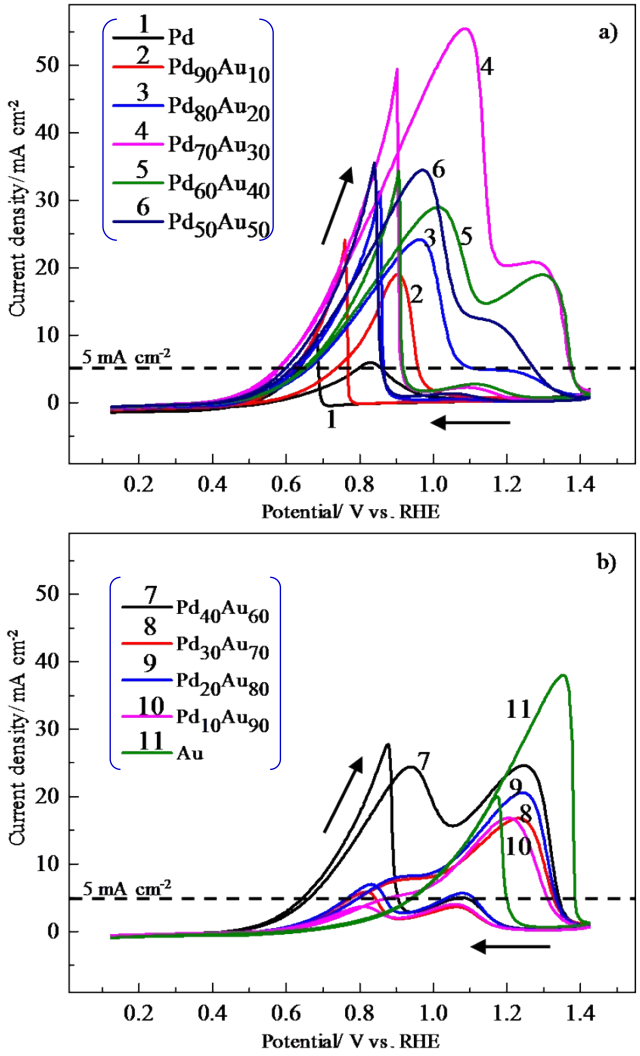

Fig. S3. Cyclic voltammetry curves of the $Pd_{100-x}Au_x$ compositions in 1 M ethanol represented in units of current density (mA cm^{-2}). Scan rate: 20 mV s^{-1}.

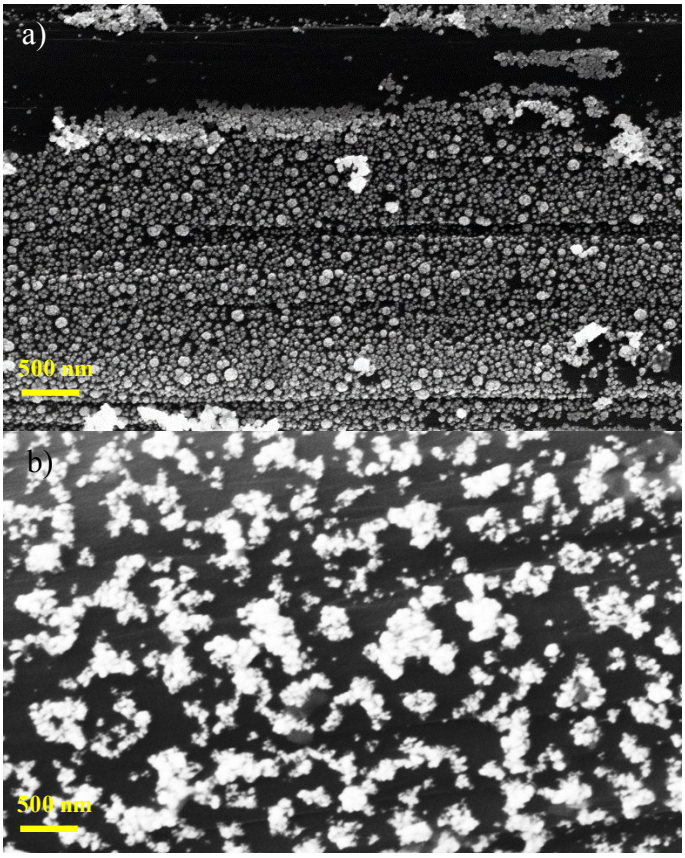

Fig. S4. FE-SEM image recorded for the surface of the $Pd_{70}Au_{30}$ composition a) before and b) after subjected to 4000 accelerated CV cycling tests.