# *Electronic Supplementary Information for*

# Evidencing the formation of Pt nano-islands on $Cr_2O_3$/Ag(111)

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## XPS and ARXPS characterization

FIG. S 1 (i) shows the XPS spectra for the clean Ag(111) surface, FIG. S 1 (ii) shows the $Cr_2O_3$/Ag(111) surface, and FIG. S 1 (iii) after Pt deposition. All XPS spectra were collected after annealing.

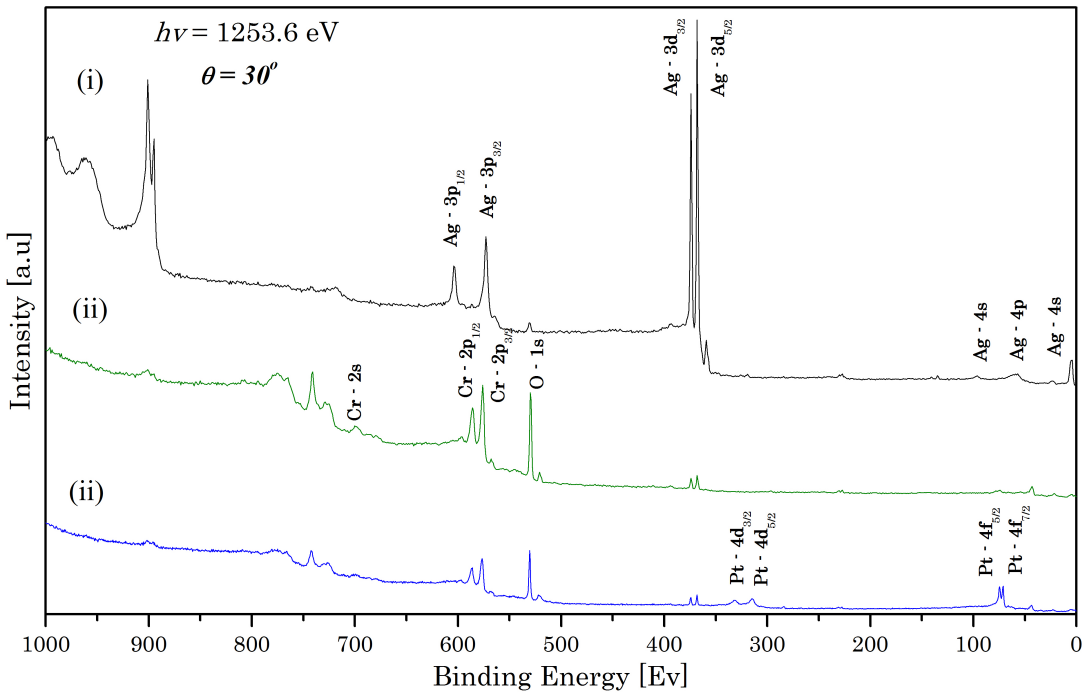


**FIG. S 1. XPS Spectra for (i) Ag(111), (ii) $Cr_2O_3$/Ag(111) and (iii) Pt/$Cr_2O_3$/Ag(111) surfaces.**

FIG. S 2 (a) shows the peak intensity ratios between $Pt4d_{3/2}$ and $Cr2p_{3/2}$. As the polar angle $\theta$ increases, the sensitivity to the photoelectron signal emitted from the

sample surface increases. FIG. S 2 (a) indicates an increment of Pt/Cr peak intensity ratio for higher values of θ (grazing angles). This demonstrates the Pt atoms predominance on the topmost surface in comparison to Cr, and no evidences of Pt diffusion. FIG. S 2 (b) reveals a linear fitting applied for Pt/Cr ratio. The calculations performed with ARXPS for this fitting provides a 5.6 Å thickness for the Pt nanoislands, about 2.5 ML.

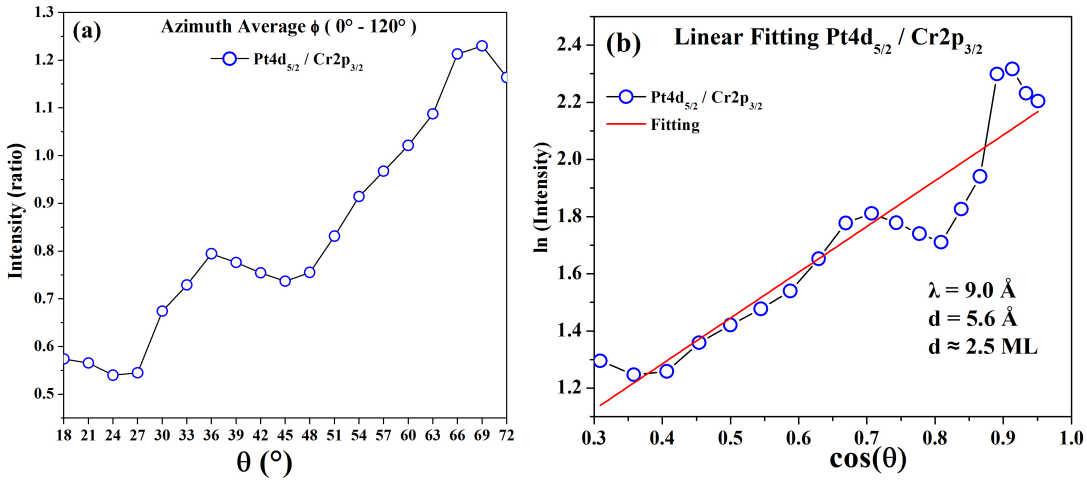


**FIG. S 2. (a) $Pt4d_{5/2}/Cr2p_{3/2}$ peak intensity ratio polar scan and (b) the linear fitting applied.**

## XPD Simulations for $Pt/Cr_2O_3/Ag(111)$ system

FIG. S 3 shows a contour map for the inner potential ($V_0$) and Debye temperature ($T_\theta$) versus $R_a$ factor. The regions with $V_0$ values between 15 and 20 eV and $T_\theta$ values between 210 and 270 K reveals an increment of $R_a$ factor values. For $V_0$ values between 5 and 10 eV and $T_\theta$ values between 150 and 210 K a decrease of the $R_a$ values occurs. Considering these results, the values used for the structural optimizations in this work were $V_0 = 5$ eV and $T_\theta = 170$ K.

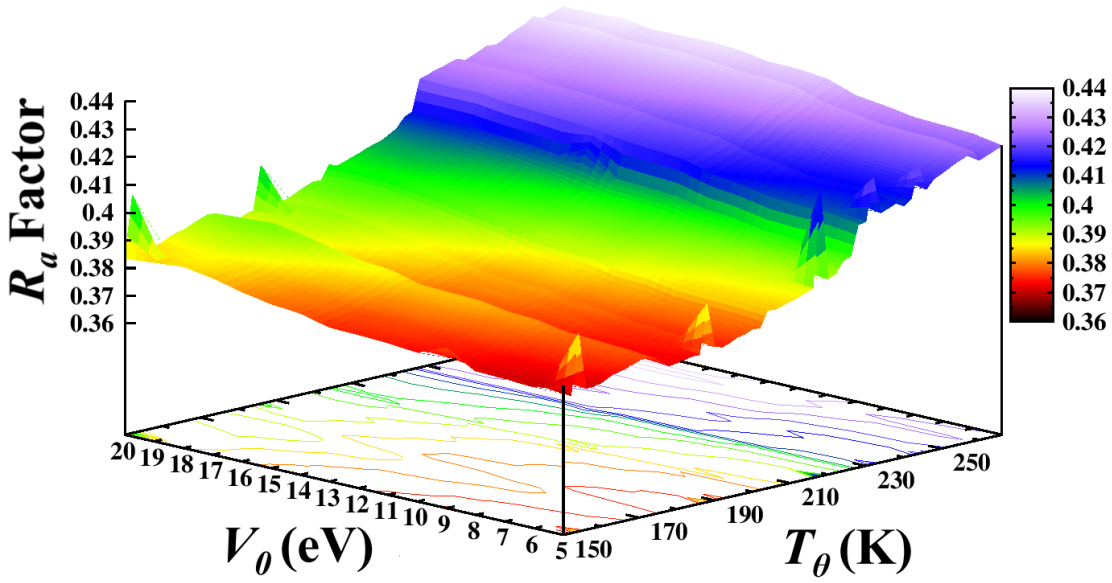


**FIG. S 3. Contour map for the inner potential ($V_0$) and Debye temperature ($T_\theta$) versus $R_a$ factor.**