Supplementary Materials: Oxidative Thermal Sintering and Redispersion of Rh Nanoparticles on Supports with High Oxygen Ion Lability

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Table S1. H_2-uptake values obtained by the isothermal H_2-chemisorption experiments and corresponding Rh dispersion values D (%)

Catalyst	H_2 uptake in H_2-chemisoprtion experiments (cc/g_{cat})			Rh Dispersion, D (%)		
	Fresh	Sinter #1	Sinter #2	Fresh	Sinter #1	Sinter #2
Rh/γ-Al_2O_3	1.05	0.816	0.490	88	69	41
Rh/ACZ	0.735	0.898	0.772	77	91	81
Rh/CZ	0.260	0.621	0.595	27	65	62

CALCULATIONS:

(i) Dispersion, D (%):

$$D\ (\%) = \frac{(H_2 - uptake) \cdot F_s \cdot AW_{Metalt} \cdot 100}{V_{mol} \cdot (metal\ loading/100)}$$

(ii) Specific metal surface area, S_{SP}, (in m^2/g of catalyst):

$$S_{SP}\ (in\ \frac{m^2}{g_{cat}}) = \frac{(H_2 - uptake) \cdot N_{AV} \cdot F_s \cdot S_{atom} \cdot 10^{-20}}{V_{mol}}$$

(iii) Average metal particle size diameter, d_{Metal} (nm):

$$d_{Metal}\ (nm) = \frac{6 \cdot (metal\ loading/100) \cdot 10^3}{S_{SP} \cdot \rho_{met}}$$

or

$$d_{Metal}\ (nm) = \frac{6 \cdot V_{mol} \cdot (metal\ loading) \cdot 10^{21}}{(H_2 - uptake) \cdot N_{AV} \cdot F_s \cdot S_{atom} \cdot \rho_{met}}$$

where

AW_{Metal}: relative atomic mass of a metal (e.g. Rh=102.9)

V_{mol}: molar volume of an ideal gas at room temperature and 1 atmosphere of pressure (~24450 cc/mol)

metal loading: wt% of metal on catalysts (for the present catalysts: 1, 0.8 and 0.8 wt% on Rh/γ-Al_2O_3, Rh/ACZ and Rh/CZ, respectively).

N_{AV}: Avogadro number (=6.023x10^{23} atoms/mol)

F_s: hydrogen to metal correlation factor (=2 in case of one-to-one correlation of adsorbed H atoms with metal sites, i.e. H-Rh)

S_{atom} = cross sectional surface area of a metal atom (for Rh: 7.6 $Å^2$/atom = 0.076 nm^2/atom)

10^{-20}: *unit conversion factor* (m^2/ $Å^2$)
10^3: *unit conversion factor* ($m^2 \cdot nm/cm^3$)
ρ_{met} = metal density (for Rh: 12.4 g/cm^3)