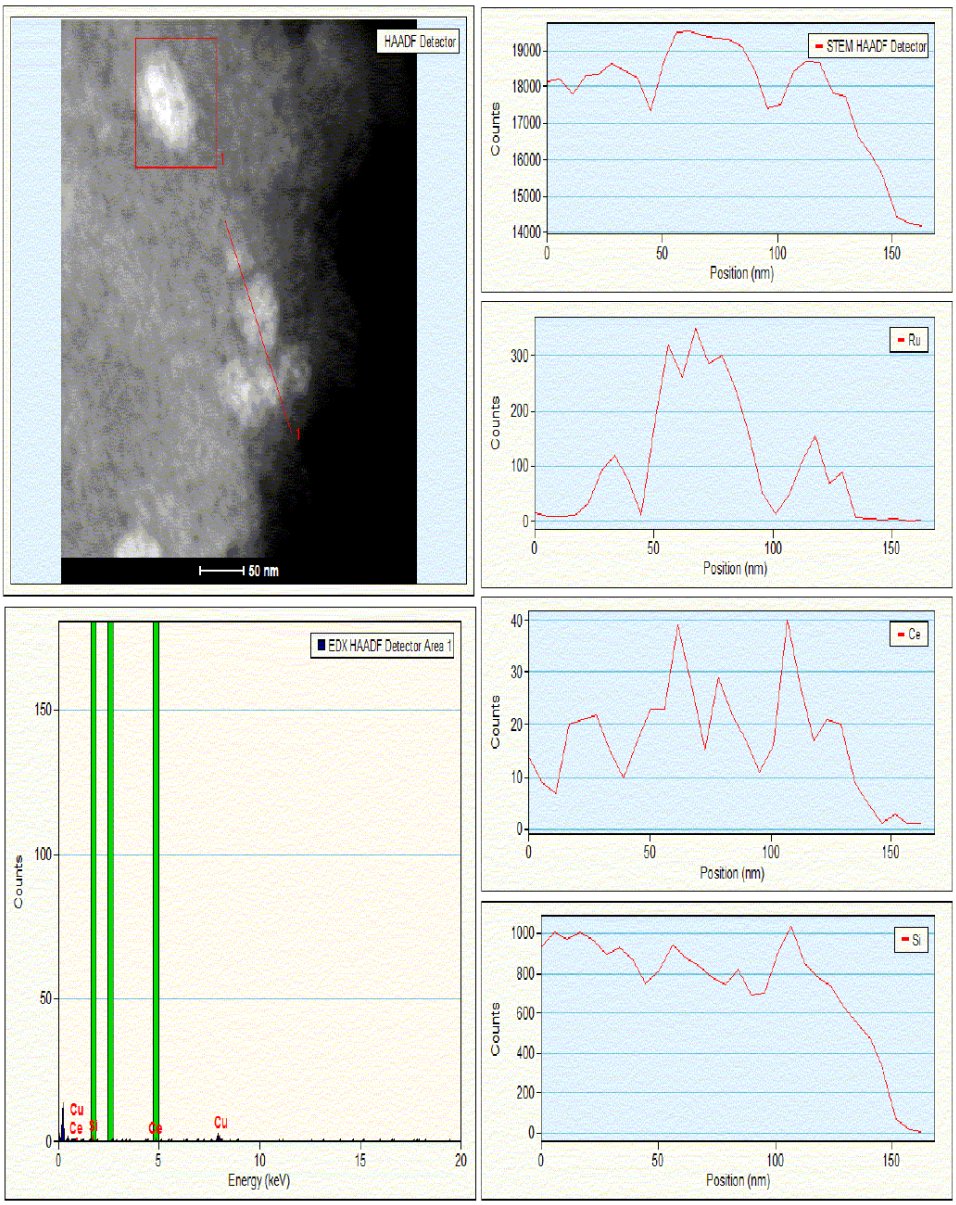
Supplementary Material (ESI) for Chemical Communications

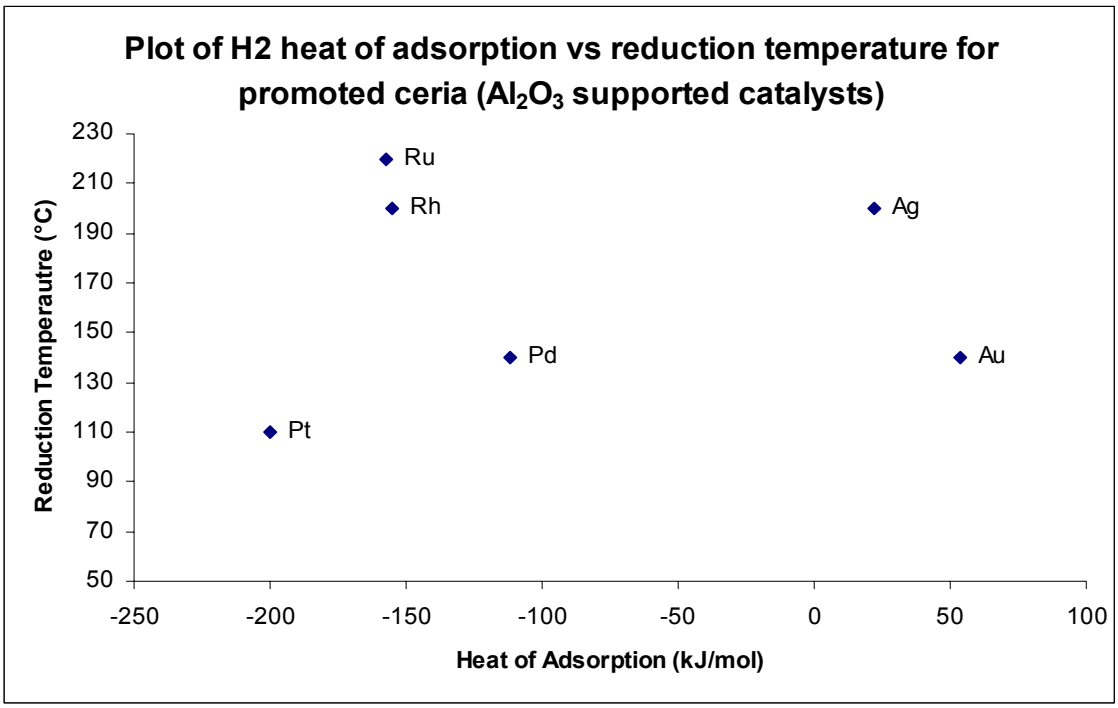
Supplementary information for manuscript B718956G

Suplementary figure 1 shows an EDX line scan for ceria coated Ru/SiO_2. Supplementary figures 2 and 3 show the promoted ceria reduction temeprature for the ceria coated PGM catalysts on silica and alumina vs heat of adsorption of hydrogen. Heat of adsorption of hydrogen data were obtained from V.I. Kopylets, *Materials Science* 1999, vol 35 (3), p348. These data taken from the Kopylets reference are an average of 3 values calulated using *ab initio* and semi-empirical calculations. These figures indicate that the reduction temeprature of promoted ceria is not related to the strength of hydrogen adsorption, which would be expected if spillover were the only model applicable to this system. Figure 3 shows the results of an *in situ* TPR experiment as monitored by diffuse reflectance UV (DRUV). This experiment shows that the band gap of ceria decreases with reduction temperature. This is in agreement with the junction effect theory, which predects that electron flow from ceria to the metal on creation of vacancies results in a decrease in band-gap.

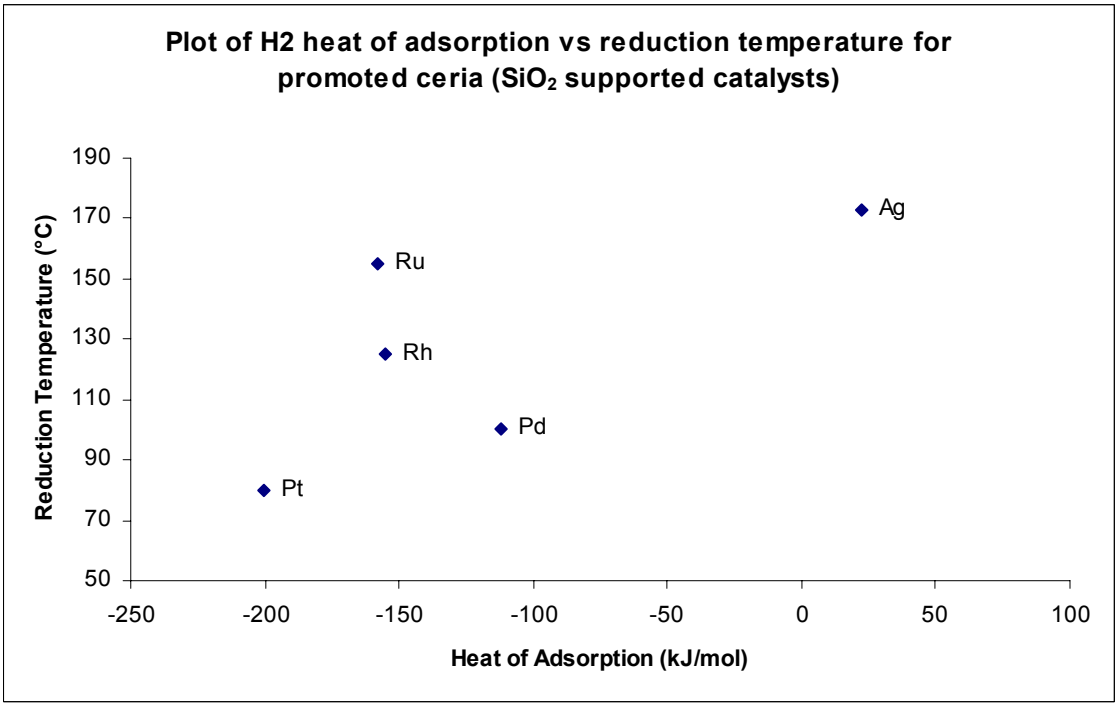
Supplementary figure 1



Supplementary figure 2



Supplementary figure 3



Supplementary figure 4