Hiden Reference: AP0080
Hiden Product: HPR-20

Growing hydrogen expectations: embedded catalyst design for active and stable catalysts

Hydrogen as an energy vector in combination with fuel cells is one of the emerging energy solution in terms of sustainability and low environmental impact. H_2 sustainable production is therefore one of the key target of today. Recently, the Materials, Environment and Energy research group at the University of Trieste, coordinated by Professor Paolo Fornasiero investigated various options for H_2 production and purification by using a Hiden HPR 20 quadrupole mass spectrometer.
http://www.dsch.units.it/~fornasiero/index.htm

The mass spectrometer was used to prove the superior thermal stability, during methane partial oxidation Figure 1, of an innovative embedded $Rh@Al_2O_3$ catalyst with respect to conventional impregnated material (1).

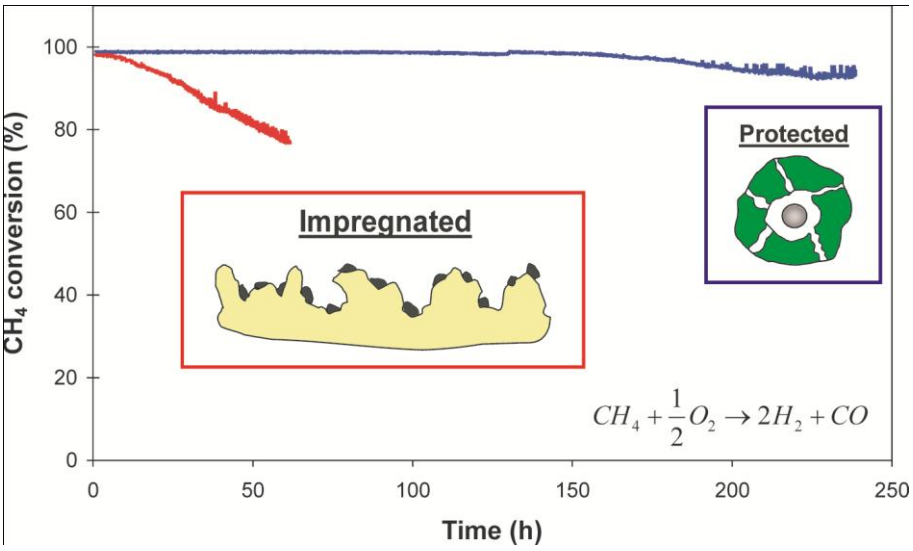

Figure 1: Methane conversion at 750°C vs reaction time over a conventional impregnated $Rh(1wt\%)/Al_2O_3$ and a protected / embedded $Rh(1wt\%)@Al_2O_3$ catalyst. Adapted from Ref. (1).

More recently, the same research group used the mass spectrometer to investigate methanol steam reforming and Water Gas Shift Reactions over an embedded $Pd@CeO_2$ (2) and the Preferential Oxidation Reaction over an embedded $Au@CeO_2$ catalyst under (3). Furthermore, it was used to characterize an embedded $Ru@ZrO_2$ based catalyst during ammonia decomposition reaction (4). Finally, the Hiden HPR 20 quadrupole mass spectrometer was determinant to evaluate the amount and nature of coke deposited during ethanol steam reforming on $Cu/ZnO/Al_2O_3$ based catalysts (5).

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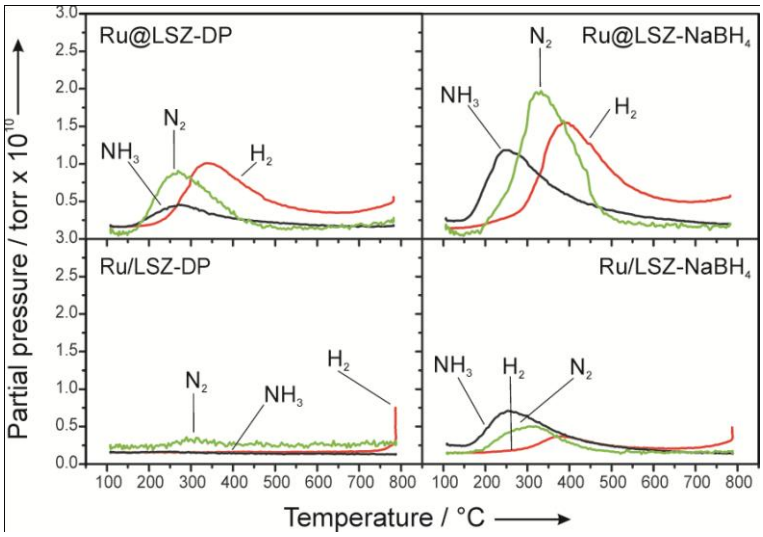

Figure 2: NH_3-TPD on embedded Ru@LSZ and impregnated Ru/LSZ catalysts. Adapted from
Ref (4).

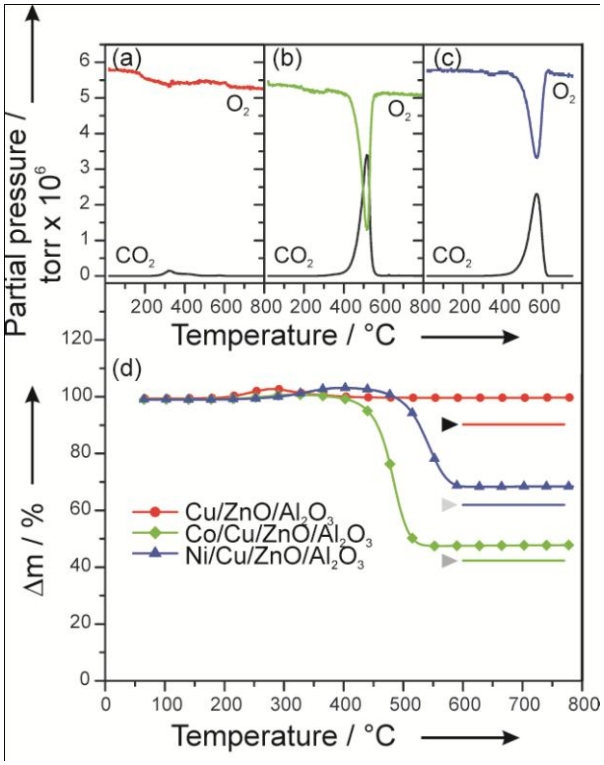

Figure 3: Coke characterication by Temperature Programmed Oxidation (TPO) after ethanol steam reforming on $Cu/ZnO/Al_2O_3$-C (a), $Co/Cu/ZnO/Al_2O_3$-C (b) and $Ni/Cu/ZnO/Al_2O_3$-C (c) and TGA analysis of the same samples (d). Adapted from Ref. (5).

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Hiden Product:
HPR-20
Follow the link to the product catalogue on our website for further information:
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