

Nitrogen-doped alumina carrier for sintering resistant gold supported catalysts

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The commercially available foil made from an aluminum-containing heat-resistant steel alloy foils (Fecralloy®) was used for the alumina film preparation. Au nanoparticles were deposited on the surface of prepared model supports by vacuum deposition using an EFM3 evaporator (electron beam evaporator). The resistive heating by the tungsten wire legs spot welded to the back side of the foil disks was used in order to anneal the samples under UHV conditions. The sample temperature was measured by a K-type thermocouple spot-welded directly to the samples.

X-ray photoelectron spectroscopy study was performed using a VG ESCALAB HP electron spectrometer. The nonmonochromatic Mg-K α line at 200 W was used for the primary excitation. The spectrometer was calibrated using the Au 4f $_{7/2}$ (84.0 eV) and Cu 2p $_{3/2}$ (932.7 eV) peaks.¹ Residual gas pressure was lower than 10⁻⁷ Pa. The positions of Fe 2p line (BE = 707.0 eV) and C 1s line (BE = 284.5 eV) were used as the internal standards for the spectra calibration.¹ The binding energy values and the areas of XPS peaks were determined after the Shirley background subtraction and analysis of line shapes.²

References

1 J. F. Moulder, W. F. Stickle, P. E. Sobol and K. D. Bomben, *Handbook of X-ray Photoelectron Spectroscopy*, eds. J. Chastain and R. C. King, Jr., Perkin-Elmer, Eden Prairie, MN, 1992.

2 *XPSPEAK 4.1 software for Windows 95/98*, <http://www.phy.cuhk.edu.hk/~surface/XPSPEAK/>.