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Catalytic decomposition of N_2O over Au/oxides

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Nitrous oxide (N_2O) is one of the most powerful greenhouse gases with a high global warming potential (approximately 300 times higher than CO_2). N_2O is responsible for the depletion of stratospheric ozone layer due to its long lifetime in atmosphere (~150 years). The present work aims to explore the effect of the support (Al_2O_3, CeO_2, Fe_2O_3, TiO_2 and ZnO) on the catalytic decomposition of N_2O (deN_2O) over Au-based catalysts prepared by a deposition-precipitation method. The following activity order was recorded: $Au/Fe_2O_3 > Au/CeO_2 > Au/ZnO > Au/TiO_2 > Au/Al_2O_3$. An inferior deN_2O performance was obtained for bare supports, following, however, the same order as the gold loaded materials. A close correlation between the deN_2O performance and the redox properties of oxide carriers was found, on the basis of a redox type mechanism. The addition of gold further enhanced the surface oxygen reduction, facilitating the deN_2O process. Moreover, the low gold nanoparticles size (~2 nm) and the Au+ oxidation state of Au/Fe_2O_3 sample can be further accounted to explain the superior performance of this material.

Biography

Sónia A C Carabineiro has completed her PhD in 2001 at the Universidade Nova de Lisboa (Portugal) and Post-doctoral studies from Leiden University (The Netherlands) and Instituto Superior Técnico (Portugal). In December 2007, she joined the University of Oporto (Portugal) as an Assistant Researcher and became Principal Researcher by December 2013. She has published more than 90 papers in reputed journals and 19 book chapters. She has an h index of 24 and over 1400 citations (Scopus, May 2016). She is particularly interested in catalysis by gold, (mixed) metal oxides, carbon materials and in heterogenisation of homogenous materials for oxidation reactions.

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