

Étude de lits catalytiques structurés à base de métaux nobles pour les réactions WGS

Structured reactors for pure H₂ production- WGS case

Svetlana Ivanova, University of Seville, Spain

The new challenge, that renewed the interest on water gas shift process (WGS), concerns the development of catalysts able to implement the fuel cell technology on portable devices. Among the requirements established for that novel purpose is the decrease of the contact times needed for achieve acceptable CO conversions and reactor volume reduction. Compared to stationary applications, the volume of a portable fuel processor is strongly constrained by the need for compaction and fast response. An alternative to diminish the catalyst bed volume while maintaining higher catalytic efficiency is the use of structured reactors. Structured systems are already existing alternatives to packed fixed bed reactors which allows higher space velocities, process intensification and lower pressure drops. The process intensification is normally related to the higher surface to volume ratio provided by these reactors resulting in volume reduction and higher efficiencies in the catalytic reactions. The development of WGS structured reactors is not an easy task and requires good knowledge of the reaction and employed catalysts. Thus, any improvement of the reactor passes through understanding of the limiting steps of the reaction and/or catalysts. A new concept of structure reactors development is related to the presence of a pre-catalytic “buffer” layer formed by WGS-inert oxide, with the purpose to increase the number of participating sites in water dissociation step during the reaction. Some results, general concerns and catalyst development concepts will be discussed during the presentation.