catalysts

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Catalysts for Water-Gas Shift Reaction

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Deadline for manuscript submissions:
closed (30 June 2020)

Message from the Guest Editors

The majority of industrial H_2 is currently produced by methane steaming reforming (MSR) followed by water-gas shift (WGS) reaction to control the H_2/CO ratio and is employed in numerous applications such as ammonia synthesis, methanol synthesis, synthetic fuels, etc. Although there is much interest in developing sustainable H_2 production from photocatalytic/electrocatalytic splitting of H_2O and biomass reforming, production of H_2 from fossil fuels (CH_4, hydrocarbons and coal) will be around and expand for quite some time given its established technology and cost competitiveness. Currently, the WGS reaction is commercially performed in several stages with different catalysts to optimize the greater CO equilibrium conversion attained at lower temperatures because the reaction is exothermic and reversible. Commercially, the low-temperature WGS (LT-WGS) reaction is performed at ~190–250 °C with a $Cu/ZnO/Al_2O_3$ catalyst, and the high-temperature WGS (HT-WGS) reaction is performed at ~350–450 °C with a Cu promoted chromium-iron mixed oxide catalyst.