

“Perspectives for CO₂ Utilization”

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CO₂ is dramatically impacting our life: climate change and consequent social-economic problems are identified as Grand Challenges of current century. Main agencies identified that 87% of anthropogenic CO₂ emissions are due to combustion of fossil fuels and it is estimated that overall average anthropogenic carbon emissions were 30 Gt/y in last years. The technological problem with anthropogenic CO₂ is not only inherent in the molecule chemistry but also in the form of exhausts: these are gases released into atmosphere at low pressure, in large amounts, where CO₂ is mixed with H₂O, N₂ and other combustion products. As a consequence, it realizes to be difficult and costly to process such exhausts; CO₂ sequestration by chemical-physical washing and subsequent disposal in remote storages still remains a challenging and questionable technique. In the last two decades, a large portion of the scientific and engineering community has faced the problem from upstream, therefore focusing on mitigation of CO₂ impacts by reducing its production (i.e. renewable energies); on the other hand, the problem can be faced from downstream also by implementing utilization processes of produced CO₂. Use of exhausted or atmospheric CO₂ for direct methanol production (by CO₂ hydrogenation), as proposed by Olah, represents an example of downstream approach to the problem and, according to post-Horizon2020 directives of European Community, CO₂ utilization seems to be a faster track with respect to other routes to tackle CO₂ emissions and the plenary contribution will mainly focus on existing and promising processes for bulk reusing of produced CO₂ providing CO₂-free perspectives for main chemical synthesis.