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"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.