Low-cost Catalyst for artificial photosynthesis and valorization of wastes

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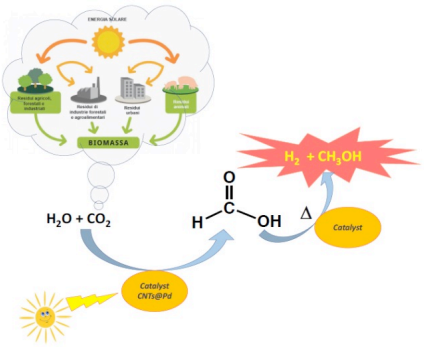
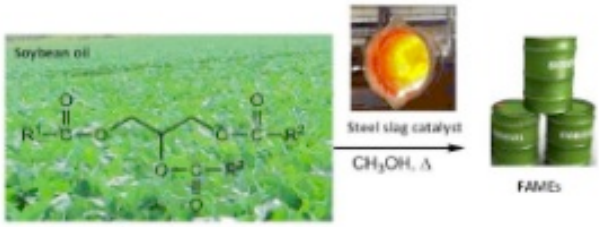
Research is currently intensely focused on the use of renewable resources to produce energy and new innovative materials. Particular attention is paid to waste as raw materials for the production of biodiesel, lubricants, surfactants, polymers, solvents and fine chemical products. The development of efficient and sustainable catalytic processes is the main goal to achieve these transformations, and heterogeneous catalysts play the dominant role for industrial applications.
In this context, in line with new Green Chemistry rules [1], this communication shows the usage of catalysts based on "non-critical materials" capable of promoting biodiesel production [2,3] and CO_2 photoreduction with sunlight. In addition, some catalytic systems here described are in line with Circular Economy principles, being derived from steel slag and, for the first time in the literature, applied to artificial photosynthesis [4].





Finally, as example of decarbonization chemical process, the transformation of cellulose wastes in top value chemicals and Graphene carbon dots are shown.

References:

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[3]. Casiello M.; Losito O.; Aloia, A.; Caputo, D.; Fusco, C., Attrotto, R.; Monopoli, A:, Nacci, A.; D'Accolti, L. Steel slag as new catalyst for the synthesis of fames from soybean oil, Catalysts **2021,** DOI: 10.3390/catal11050619

[4]. Fusco, C.; Casiello, M.; Pisani, P.; Monopoli, A.; Fanelli, F.; Oberhuaser, W.; Attrotto, R.; Nacci, A.; D'Accolti, L. Steel slag as low-cost catalyst for artificial photosynthesis to convert CO2 and water into hydrogen and methanol-Scientific Reports 12, 1, **2022** DOI: 10.1038/s41598-022-15554-3 (Top *100 2022)*