

Nano-catalysts for sustainable energy and environment

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Sustainability has grown one of the hardest challenges of the modern era. The continuous increase in population joined with skyrocketing of global consumption has been accompanied by serious environmental impact in terms of global warming, pollution, as well as depletion of natural resources. This makes the linear economical model no longer practicable and enforces the urgent transition towards a circular, more sustainable alternative.

In this context, nanotechnologies can play a key role in providing innovations and technological solutions that match the needs of our society with planet care. Indeed, in view of their reduced size, at the atomic/molecular scale nanomaterials exhibit unique and tunable physico-chemical properties. Furthermore, the extremely small size maximizes the surface area exposed and availability of active sites resulting in an enhanced activity with a significant reduced amount of critical materials [1].

This talk focuses on the potential of nano-catalysts for sustainable technologies. First, the impact of nanomaterials on technologies for energy harvesting, storage and conversion will be highlighted, encompassing fuel cells [2]. Then, the role of nanomaterials in water remediation and pollution control will be examined with a particular note to emerging contaminants [3,4]. Following an integrated and bioinspired approach to sustainability, particular attention will be devoted to green and sustainable nano-catalysts obtained from waste valorization.

A holistic understanding of the versatile applications of nanostructured systems will be provided, offering insights into their present impact and future potential in addressing global challenges in energy, and the environment.

References

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