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Hydrogen Energy and the Area of Materials in Brazil

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The environmental emergency the planet was already submitted became more impacting with the devastating large-scale Covid-19 pandemic in the whole world and particularly in a socially unfortunate way in Brazil. The necessity to implement sustainable technologies in all sectors became evident. This has emphasized the search for nonpolluting ways to generate and to use energy, and preferably renewable energies and hydrogen energy. Decreasing or even eliminating the generation of greenhouse gases, hydrocarbons resultant from the combustion of fossil fuels and particulate materials, especially in urban regions, also reduces the impact of respiratory and cardiac illnesses [1], which create comorbidities that are capable of producing deleterious synergy with Covid-19. Because of that, embracing technologies for the use of hydrogen and fuel cells [2] have gained strong evidence.

In the beginning of 2021, more than 30 countries have published roadmaps for hydrogen energy, the industry has announced more than 200 projects on hydrogen and fuel cells, with ambitious investment plans of more than 70 billion dollars from public money [3]. In addition to that, more than 20 countries expressed their will to ban the use of vehicles with internal combustion engines before 2035 and it has been identified that cost parity of diesel heavy vehicles with those possessing electrical motorization with hydrogen and fuel cell will occur between 2025 and 2028. Small and huge urban centers have created regulations for sustainable transport, such as the case of Maricá, RJ [4] and the city of Rio de Janeiro [5].

In the latter, the collective public transport of passengers made by buses from January 1st, 2025 on will only be allowed under contractual utilization of zero emission buses. Moreover, new procedures that went through long years of scientific development now begin to find large-scale practical applications to make CO_2 air capture and sequestration [6]. Such new prospects have opened enormous possibilities for scientific development and technological demonstration for the area of materials. This is so because new materials are required for all categories and, principally, nanostructured materials, composite materials, new metallic materials, ion conducting polymers, mix conducting ceramics and films with electrocatalytic properties.

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