

20º PROCESSO DE SELEÇÃO DE CANDIDATOS AO CURSO DE MESTRADO EM QUÍMICA - PPGQUIM - 2023/2

**CHAVES DE RESPOSTA - PRIMEIRA ETAPA
AVALIAÇÃO DE LÍNGUA INGLESA**

Leia o texto para responder as questões que seguem:

“A pilot project has succeeded in scaling-up production of hydrogen using solar power, opening the door for the technology to be used in the battle against climate change.

Hydrogen has long been touted as a possible carbon-neutral fuel source that could be used to transition away from more polluting alternatives, such as oil and gas. It can be burned cleanly, and 1 kg of hydrogen gas has the same energy as around 2.8 kg of petrol, meaning it could be highly efficient. However, scientists have struggled to find a way to produce hydrogen in bulk using technologies that don't have their own hefty carbon footprint. Currently, most hydrogen is produced via gas or steam reforming – classed as ‘brown’, ‘grey’ or ‘blue’ depending on the method used. A more environmentally friendly way, dubbed ‘green’ hydrogen, is to use electrolyzers to split water – effectively carbon-neutral – but this requires a tremendous amount of energy, and previous efforts have struggled to deliver this using renewable sources, such as solar, wind or geothermal power. [...]

The group, led by Sophia Haussener, used a sun-tracking, oversized solar dish that was capable of concentrating light to the equivalent of 800 suns. This was then coupled to a photo-electrochemical device that integrated all the key requirements of converting the solar rays into electricity, as well as an electrolyser and water-based heat exchanger, which could be used to split water to produce hydrogen and oxygen [...]. After allowing for the standard energy losses that are usual with solar technology, the team reported a solar-to-hydrogen efficiency of more than 20%. [...]

Although there is a long way to go before such technology could be used in our homes – particularly as hydrogen is difficult to store at standard temperatures and pressures – the work demonstrates the technical feasibility of such devices, says Aldo Steinfeld, a professor at ETH Zurich, Switzerland and expert in solar fuels. ‘Moving from the laboratory to the field is a critical phase in technology development,’ he adds. ‘The authors have successfully accomplished this phase by demonstrating the on-sun operation of the entire solar fuel system at the kW scale under real, intermittent solar irradiation conditions. The findings are relevant for the large-scale implementation of the technology’.”

Fonte:

<https://www.chemistryworld.com/news/solar-hydrogen-production-scaled-up-in-real-world-test/4017291.article> (acesso em 17/06/2023)

1. This passage is mostly about:

- (a) the advantages of using hydrogen as spatial fuel.
- (b) the consequences of the climate change.

- (c) the development of a technology to produce hydrogen in a large scale.
 - (d) the challenges to generate hydrogen in laboratory.
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2. According to the text, the more environmentally friendly way to generate hydrogen is through:

- (a) the reduction of water using solar energy.
 - (b) the split of water using electrolysis.
 - (c) the reaction of hydrocarbons with water.
 - (d) the natural gas steam reforming.
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3. According to the text, a disadvantage in the hydrogen production from a more environmentally friendly way is:

- (a) the scarcity of renewable sources to produce the required energy.
 - (b) the low efficiency of the process.
 - (c) the large amount of required energy.
 - (d) the high cost of the necessary reagents.
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4. Read the following sentence: "However, scientists have struggled to find a way to produce hydrogen in bulk using technologies that don't have their own hefty carbon footprint".

The word "their" refers to:

- (a) scientists
 - (b) hydrogen
 - (c) carbon footprint
 - (d) technologies
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5. Read the following sentence: "... that integrated all the key requirements of converting the solar rays into electricity, as well as an electrolyser and water-based heat exchanger, which could be used to split water to produce hydrogen and oxygen".

The word "which" refers to:

- (a) electricity

- (b) solar rays
 - (c) exchanger
 - (d) could
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6. According to the text, it is correct, except:

- (a) Hydrogen is a carbon-neutral fuel source that can be efficiently used to replace polluting alternatives of energy generation.
 - (b) Solar, wind or geothermal power could be used as renewable source to generate the large amount of energy required to produce “green” hydrogen.
 - (c) The transference of the new technology of hydrogen production from laboratory to the field is a critical step in technology development.
 - (d) **A new technology of production of hydrogen using solar power is available to be used in our homes.**
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7. In the sentence “This was then coupled to a photo-electrochemical device that integrated all the key requirements of converting the solar rays into electricity”, in the third paragraph, the word “integrated” could be replaced with:

- (a) homogenized
 - (b) **unified**
 - (c) needed
 - (d) followed
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8. In the sentence: “The authors have successfully accomplished this phase by demonstrating the on-sun operation...” the personal pronoun which replace the subject “the authors” is:

- (a) **They**
- (b) You
- (c) it
- (d) He