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PLANES, TRAINS AND AUTOMOBILES

Platinum-based hydrogen fuel cells can provide emissions-free solutions across many modes of public transport

The iconic London double decker is set to become emissions-free next year when, in a world first, twenty such buses will be servicing routes throughout the capital powered by platinum-based hydrogen fuel cells which produce zero tail pipe emissions.

These ground-breaking red buses will join a growing number of global initiatives across all modes of public transport that are demonstrating the vital role platinum-based hydrogen fuel cells can play in decarbonising transportation.

In fact, according to the International Energy Agency, fuel cell electric buses are seeing significant growth, especially in China where thousands are expected to be in operation by the end of 2020.

Meanwhile, Korea aims to deploy 1,000 fuel cell electric buses by 2022 on the way to achieving its stated target of 40,000 by 2040. Japan is currently focusing its efforts on the 2020 Olympic Games, where it aims to use a fleet of 100 fuel cell electric buses.

Rail operators are also turning to platinum-based hydrogen fuel cells in a bid to reduce reliance on fossil-fuels, especially as an alternative to diesel trains in parts of the network that are not subject to electrification.

The first-ever fuel cell electric passenger trains commenced service in Germany in September 2018, with a further 41 due to for deployment in the country by the end of December 2022.

In the UK, where only around one third of the rail network is electrified and the government is committed to phasing out diesel trains by 2040, the first fuel cell trains are planned for 2022.

Elsewhere, platinum-based fuel cell technology is being applied to ferries. The US's San Francisco Bay area is due to commence trials of a hydrogen fuel cell passenger ferry soon.

In a further example, one of Norway's largest ferry and express boat operators is developing a fuel cell vessel for operation in 2021 with the capacity for 299 passengers and 80 cars.

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Why platinum-based fuel cells?

In a platinum-based fuel cell, electricity is generated through an electrochemical reaction by combining hydrogen and oxygen, with heat and water as the only by-products. Molecules of hydrogen and oxygen react and combine using a proton exchange membrane (PEM) which is coated with a platinum catalyst, and there is no combustion. Platinum is the only element that can effectively perform this function within a PEM.

In many cases, those looking for fossil fuel-free transport solutions with zero emissions (other than water) are increasingly recognising that platinum-based hydrogen fuel cells are the technology that best meets their needs. Fuel cells offer the range and power output needed by vehicles like buses that batteries alone cannot offer.

Of course, fuel cells share many of the characteristics of a battery: silent operation, no moving parts and an electrochemical reaction to generate power. However, unlike a battery, fuel cells do not necessitate lengthy recharging stops to 'refuel', a further advantage.

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