燃料电池用全氟磺酸树脂和全氟羧酸树脂及质子交换膜的豁免申请

Application for Derogations from PFAS REACH restriction for Permanent Exemption of Fluoropolymers and Proton Exchange Membranes for Fuel Cells

议题：燃料电池用含氟聚合物及质子交换膜的永久豁免申请

Topic: Application for permanent exemption of fluoropolymers and proton exchange membranes for fuel cells

涉及的范围：单体物质、合成的含氟聚合物树脂、质子交换膜产品、燃料电池

Scope: Monomers, synthetic fluoropolymer resins, proton exchange membrane products, fuel cells

燃料电池是一种化学电池，它利用物质发生化学反应时释出的能量，直接将其变换为电能。它工作时需要连续地向其供给反应物质——燃料和氧化剂。由于它是把燃料通过化学反应释出的能量变为电能输出，所以被称为燃料电池。具体地说，燃料电池是利用水的电解的逆反应的“发电机”。它由正极、负极和夹在正负极中间的质子交换膜组成。

The fuel cell is a chemical battery that uses the energy released during a chemical reaction to convert it directly into electricity. It works by providing a continuous supply of reactive substances - fuel and oxidant. Because it converts the energy released by the fuel through a chemical reaction into electrical energy output, it is called a fuel cell. Specifically, fuel cells are "generators" that utilize the reverse reaction of electrolysis of water. It consists of a positive electrode, a negative electrode and a proton exchange membrane sandwiched between the positive and negative electrodes.

工作时向负极供给燃料（氢），向正极供给氧化剂（空气，起作用的成分为氧气）。氢在负极分解成正离子 H+和电子 e-。氢离子进入电解液中并通过质子交换膜，而电子则沿外部电路移向正极。用电的负载就接在外部电路中。在正极上，空气中的氧同通过质子交换膜的电解液中的氢离子吸收抵达正极上的电子形成水。这正是水的电解反应的逆过程。

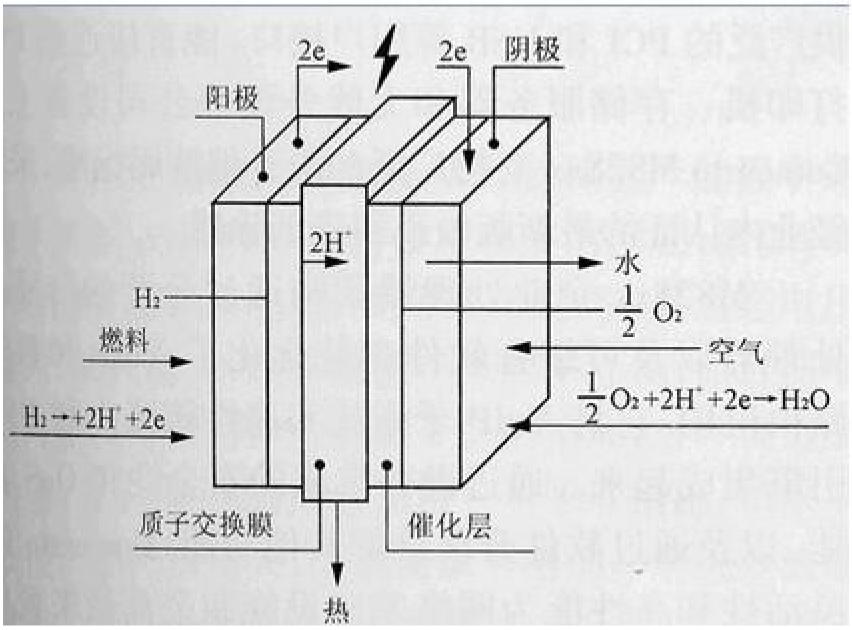
When working, fuel (hydrogen) is supplied to the negative electrode, and oxidizing agent (air, the active component is oxygen) is supplied to the positive electrode. Hydrogen splits into positive ions H+ and electrons e- at the negative electrode. The hydrogen ions enter the electrolyte and pass through the proton exchange membrane, while the electrons move along the external circuit towards the positive electrode. The load is connected to the external circuit. At the positive electrode, oxygen in the air absorbs electrons arriving at the positive electrode with hydrogen ions in the electrolyte passing through the proton exchange membrane to form water. This is the reverse process of the electrolytic reaction of water.

质子交换膜是燃料电池的一个关键组件，不可或缺。

Proton exchange membrane is a key component of fuel cells and is indispensable.

下图是燃料电池工作原理示意图。

The following diagram shows how a fuel cell works.



燃料电池质子交换膜最早是用全氟磺酸树脂加工而成的全氟磺酸型离子交换膜。后来开发出含有全氟羧酸树脂的复合膜。燃料电池质子交换膜是燃料电池的关键元件，不可或缺，是一个长达几十年的成果，当前仍旧处在不断开发过程中。制造和使用燃料电池质子交换膜需要涉及：单体、聚合物、膜制品和燃料电池四个方面。

The fuel cell proton exchange membrane was originally a perfluorosulfonic acid ion exchange membrane processed from perfluorosulfonic acid resin. Later, a composite film containing perfluorocarboxylic acid resin was developed. The fuel cell proton exchange membrane is a key component of the fuel cell, indispensable, is a decades-long achievement, and is still in the process of continuous development. The manufacture and use of fuel cell proton exchange membrane need to involve: monomer, polymer, membrane products and fuel cell four aspects.

单体有：四氟乙烯、磺酰氟单体、偏氟乙烯单体、溴侧基烯醚单体、磺酰氟烯醚单体等。

The monomers are tetrafluoroethylene, sulfonyl fluoride monomer, vinylidene fluoride monomer, bromo-side alkene monomer, sulfonyl fluorene monomer, etc.

聚合物有：全氟磺酸树脂、全氟羧酸树脂等。

Polymers: perfluorinated sulfonic acid resin, perfluorinated carboxylic acid resin, etc.

膜制品有：NafionTM 磺酸膜、GORE-SELECT® 质子交换膜、东岳未来氢能的全氟磺酸燃料电池质子膜（DMR100）。

Membrane products include: NafionTM sulfonic acid membrane, GORE-SELECT® proton exchange membrane, Dongyue Future Hydrogen Energy perfluorosulfonic acid fuel cell proton membrane (DMR100).

氢燃料电池；应用在固定式、便携式及交通运输应用中各种需要动力的领域。

Hydrogen fuel cell; It is used in stationary, portable and transportation applications where power is needed.

氢能源是更清洁、更具可持续性的能源形式，燃料电池广泛使用可以达到保护地球和保护地球人类的目标，因为化石燃料带来的污染已经成为不能承受之重。氢能作为实现能源转型和无碳化的关键要素已经在全球得到广泛认可。长远来看，氢能对众多行业的脱碳至关重要。为此提出对应用于氢燃料电池的各类氟化物，包括单体、聚合物及其膜制品进行永久豁免。

Hydrogen energy is a cleaner and more sustainable form of energy, and the widespread use of fuel cells can achieve the goal of protecting the earth and protecting people on Earth, because

the pollution caused by fossil fuels has become unbearable. Hydrogen energy has been widely recognized around the world as a key element to achieve energy transformation and non-carbonization. In the long term, hydrogen energy is critical to decarbonizing many industries. To this end, permanent exemptions are proposed for all types of fluorides, including monomers, polymers and their membrane products, used in hydrogen fuel cells.