Electroactive Sealing

A novel electroactive polymer O-ring dynamically expands using electric current to instantly detect and reseal leaks in high-heat and high-pressure sealing applications, eliminating the need for immediate system shutoff or manual repairs.

O-rings are a common component used in applications that require an airtight seal. Despite their simple design, they play a critical role in preventing leaks, which could cause severe damage to the overall device.

Researchers at Purdue University have developed an electroactive O-ring that is capable of resealing itself after detecting a leak. Made of a unique polymer, the ring expands when an electric current runs through it, resealing any detected leaks. The device is made with flexible materials that are designed to withstand high heat and pressure, making it suitable for most applications. The ability to reseal leaks dynamically provides a novel advantage in systems where immediate shutoff or repairs are not an option.

Advantages:

-Flexible material withstands high heat and pressure

-Allows quick repair in systems where immediate shutoff is not an option

Potential Applications:

-Sealing applications that use O-rings

TRL: 8

Intellectual Property:

Provisional-Patent, 2012-01-25, United States | PCT-Patent, 2013-01-25, WO | NATL-Patent, 2014-07-10, United States

Keywords: Electroactive O-ring, self-sealing polymer, dynamic leak repair, airtight seal, flexible material, high heat resistant, high pressure tolerant, polymer expansion, electric current actuation, sealing applications, Materials and Manufacturing, Mechanical Engineering, Seals, Sensors

Technology ID
65959

Category
Chemicals & Advanced Materials/Polymer Science & Smart Materials
Chemicals & Advanced Materials/Coatings, Adhesives & Sealants

Authors
Gary Krutz
Brittany A Newell

Further information
Parag Vasekar
psvasekar@prf.org

View online